
COMMONWEALTH OF VIRGINIA

**NONPOINT SOURCE POLLUTION
MANAGEMENT PROGRAM**

DECEMBER 1, 1999

Department of Conservation and Recreation

Division of Soil and Water Conservation

203 Governor Street, Suite 206

Richmond, Virginia 23219-2094

(804) 786-2064



Virginia Department of Conservation & Recreation

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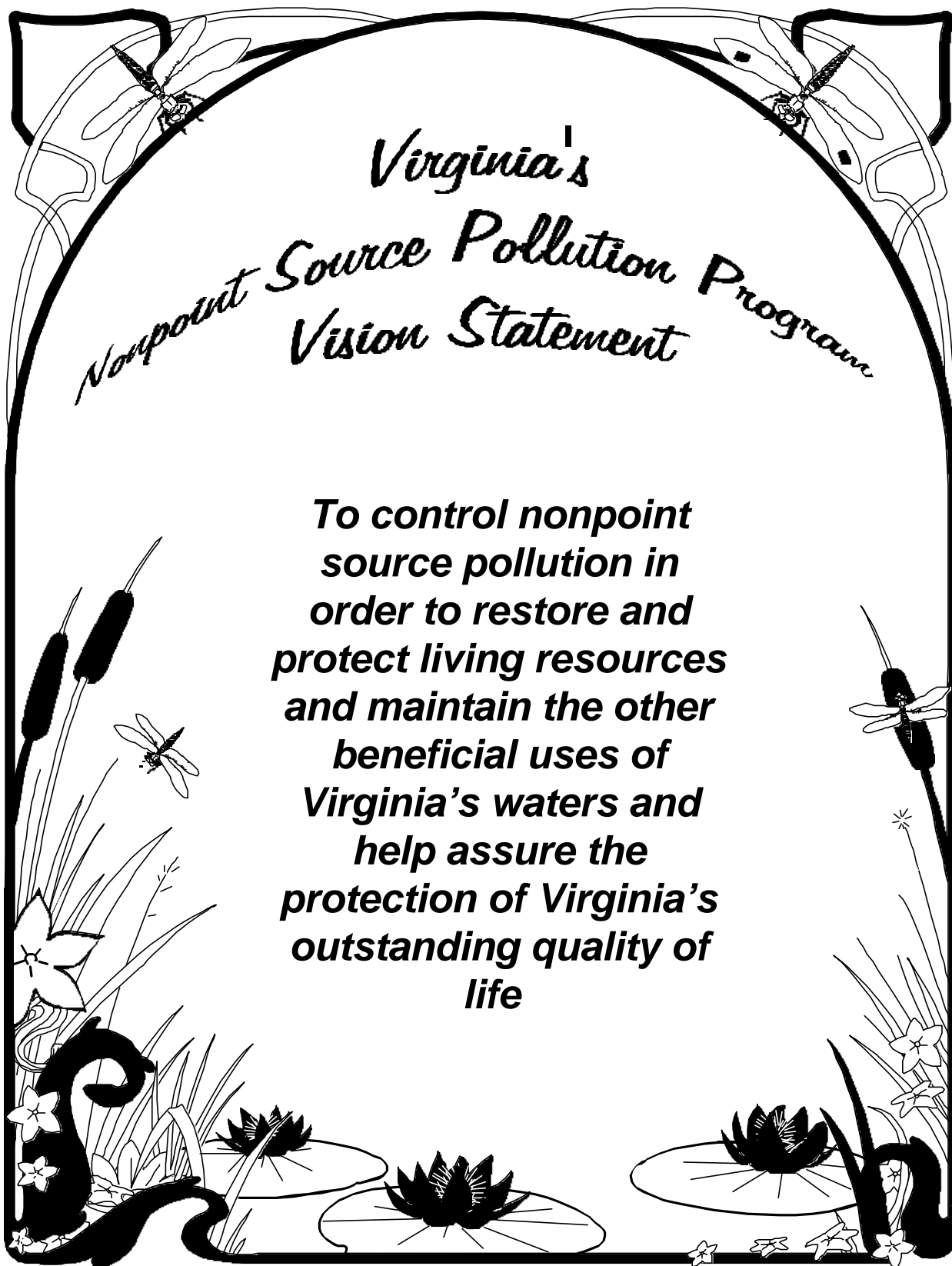
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The staff of the Department of Conservation and Recreation wish to acknowledge the many people who actively participated in this update process. Staff from several state, local, and federal agencies added this activity into their daily responsibilities. They provided descriptions of their respective programs and technical expertise in their areas. Work group participants representing business and environmental groups also made great contributions to this process. Their participation added insight and focus to the main issues. Overall, the updating mechanism and work group approach was a success due to the diligence, hard work and ability to focus on critical issues that the participants provided. (Names of all work group participants will be listed at the end of each source category chapter).



*Virginia's
Nonpoint Source Pollution Program
Vision Statement*

**To control nonpoint
source pollution in
order to restore and
protect living resources
and maintain the other
beneficial uses of
Virginia's waters and
help assure the
protection of Virginia's
outstanding quality of
life**

EXECUTIVE SUMMARY

Virginia developed its initial Nonpoint Source Pollution Management Program in 1988. The purpose of the program was to build on existing nonpoint source (NPS) pollution control efforts and to establish a comprehensive approach to NPS pollution control. Since then, state and federal program goals, requirements and laws have changed to reflect the dynamics of addressing NPS pollution. During the last several years technology has advanced, as well, keeping pace with the ever growing need for addressing nonpoint sources of pollution. As a result of these changes, and recent federal program initiatives, it was determined that a program update should be developed.

During 1999, Virginia developed this Nonpoint Source Pollution Management Program update to guide and direct federal, state, and local actions, as well as funding and citizen participation. A major program update was necessary to incorporate changes in federal and state regulations and programs, and to ensure that Virginia remains eligible for federal program funding.

In order to meet the ambitious goals and objectives set forth in this program update, it is necessary to maintain enhanced benefit status. The ability to meet the goals presented in this document is dependent upon the level of future funding to ensure sufficient resources are available.

A work group process was used to develop this program update. Work groups were formed for the following NPS source pollution categories and subject areas:

- watershed prioritization
- agriculture

- forestry
- construction and development
- monitoring and tracking
- resource extraction
- hydromodification
- grant and technical assistance coordination

The work groups comprised state and local agencies and various public and private interests. The work groups were facilitated by Department of Conservation and Recreation staff. The work groups identified goals and established objectives and strategies for each source category. These goals, objectives, and strategies are listed in tables within each NPS source pollution category chapter. The tables detail what actions will be taken over the next several years to address nonpoint sources of pollution.

There are 14 chapters in this document that describe the Virginia Nonpoint Source Management Program. Chapters I through IV provide introductory and background information on the program, federal guidance, and the update process. Chapters V through XII represent each source category. These Chapters provide a description of the main issues and the programs and tools available to address nonpoint source pollution. Chapter XIII describes the Virginia Coastal Nonpoint Source Pollution Control Program (CZARA Section 6217) in a similar manner. Chapter XIV describes program implementation and reporting.

The following sections list all goals and objectives presented in chapters IV through XIII.

WATERSHED PRIORITIZATION

Long-term Goal

Develop and fully implement a cooperative watershed management program that integrates a comprehensive basin management and targeted sub-basin approach to implementing nonpoint source pollution control

Objective 1

By 2004, establish well integrated and coordinated basin planning and management programs that minimize program overlap and leverage program resources to address contaminants that may pose risks to either the environment or public health

Objective 2

By 2005, establish well integrated and coordinated assessment and reporting programs that minimize program overlap and duplication

Objective 3

By 2003, the Department of Environmental Quality (DEQ) and the Department of Conservation and Recreation will develop the protocols and data needed to prioritize total maximum daily load (TMDL) development based on severity of impact

AGRICULTURE

Long-term Goal 1 - Confined Animal Feeding Operations

Maintain existing beneficial uses in unimpaired state waters and restore beneficial uses in surface waters where confined animal feeding operations are contributing to a water quality impairment caused by sediment, nutrients, or pathogens as listed in the 303d TMDL Priority List Report, or where ground water contaminants originating from confined animal feeding operations exceed the state ground water standard, by 2014

Objective 1

Provide assistance to producers to ensure that farms accounting for 60 per cent of the state's total number of beef, dairy, and swine animals in confinement will have adequate waste management systems and nutrient management plans by 2004

Objective 2

Provide assistance to ensure that poultry farms with 200 or more animal units will implement nitrogen and phosphorus based nutrient management plans, proper waste storage practices, and waste tracking and accounting procedures by 2004

Long-term Goal 2 - Livestock Grazing

Maintain existing beneficial uses in unimpaired state waters and restore beneficial uses in surface waters where livestock grazing operations are contributing to a water quality impairment caused by sediment, nutrients, or pathogens as listed in the 303d TMDL Priority List Report, or where ground water contaminants originating from livestock grazing operations exceed the state ground water standard, by 2014.

Objective 3

Provide assistance to farmers to ensure that controlled stream access practices will be installed on 30 per cent of livestock grazing operations for stream segments where pathogens, sediment, or nutrients from grazing livestock are contributing to an impairment by 2004

Long-term Goal 3 - Cropland Management (includes field crops, vegetables, orchards, and vineyards)

Agricultural cropland will be managed in ways which maintain or restore beneficial uses in surface waters and protect water quality in ground water by controlling losses of sediment to surface waters and losses of nutrients and toxics to ground and surface waters by 2004.

Objective 4

90 per cent of highly erodible cropland will be managed in accordance with a Natural Resources Conservation

Service (NRCS) conservation plan in watersheds where agricultural sediment is contributing to an impairment, or as necessary where basin management plans identify specific sediment reduction goals, by 2004

Objective 5

Nutrient management plans will be developed as required where basin management plans identify specific agricultural nutrient reduction targets by 2004

Objective 6

Agricultural sources of toxics will be controlled by maintaining and implementing IPM and pesticide management programs and regulations to protect ground and surface water quality statewide and to minimize effects on human and wildlife populations

Objective 7

60 per cent of farm acreage in irrigated cropland will implement improved irrigation scheduling practices by 2004

Long-term Goal 4 - Nursery and Ornamentals Management

Commercial nursery and ornamental operations will be managed in ways which maintain or restore beneficial uses in surface waters and water quality in ground water by controlling losses of sediment to surface waters and losses of nutrients and toxics to ground and surface waters by 2014

Objective 8

30 per cent of production facilities in the container nursery and greenhouse industry will use containment systems to trap sediment and recycle nutrients or implement BMPs of equivalent effectiveness by 2004

Long-term Goal 5 - Agricultural NPS Program Development

Continue to develop and implement agricultural NPS programs to effectively prevent and reduce pollution in ground and surface waters through 2014.

Objective 9

Technical and administrative program capabilities will be enhanced to address potential pollution concerns originating from confined animal feeding operations, livestock grazing, cropland management and nursery and ornamental operations through 2004

FORESTRY

Long-term Goal 1

Reduce nutrient and sediment pollution entering Virginia's waters through full implementation of the silvicultural water quality law

Long-term Goal 2

Maintain reduced levels of all nonpoint source pollutants to sustain designated uses and achieve beneficial uses of waters of the commonwealth by 2015

Objective 1

Reduce nonpoint source pollution from all harvesting activities throughout Virginia to maintain acceptable water quality and habitat

Objective 2

Ensure prompt reforestation and site stabilization using all applicable BMPs following harvest

Objective 3

Apply state-of-the art best management practices to maintained forest roads and maintain applicable standards and procedures in the use of pesticides and fire used in silvicultural operations

Objective 4

Support the Chesapeake Bay Program Riparian Forest Buffer Directive through the establishment of at least 610 miles of riparian forest buffer by 2010 within the bay watershed and target riparian restoration throughout Virginia's river corridors

Objective 5

Foster local partnerships, ordinances and innovative strategies to conserve forest lands critical to water resources, wildlife habitat, sustainable forest industries and local communities

CONSTRUCTION & DEVELOPMENT

Long-term Goal 1 - Construction Sites

Control nonpoint source pollutants related to erosion and sediment control on construction sites according to current Virginia Erosion and Sediment Control and Stormwater Management laws and regulations

Objective 1

By the year 2005, 85 per cent of Virginia's local government adopted ESC programs will be fully consistent with the state's minimum standards of effectiveness

Objective 2

By the year 2005, all state and federal agencies will achieve compliance rates on projects subject to Erosion and Sediment Control and Stormwater Management regulations

Objective 3

By the year 2003, establish effective, efficient and consistent enforcement of Virginia's Erosion and Sediment Control Law and Regulations

Objective 4

By the year 2001, develop a statewide tracking database/spreadsheet which incorporates VDOT, DEQ, DCR, and CBLAD local program and permit tracking information regarding regulated land-disturbing activities

Objective 5

By the year 2003, ensure that state agencies which are responsible for resource protection related to regulated

land-disturbing activities operate in an efficient and coordinated fashion through the development and implementation of an operational Memorandum Of Understanding (M.O.U.)

Objective 6

By the year 2002, develop an educational outreach program utilizing a variety of communication media focused on providing the general public with a basic overall understanding of nonpoint source pollution as it relates to erosion and sediment control

Objective 7

By the year 2002, investigate roadside ditch maintenance activities relative to compliance with the ESC law and address through DCR's annual plan review of VDOT's annual plan and specifications submittal

Objective 8

By the year 2008, conservation standards shall be developed to incorporate criteria, techniques, and methods for various soil types and the physical and chemical alterations to those soils that have resulted from construction and development land use changes

Long-term Goal 2 - Impervious Cover

Adequately address nonpoint source pollutants related to stream channel erosion due to increased volume and rates of flow resulting from increased impervious cover

Objective 9

By 2005, establish a statewide mandate for the local adoption of comprehensive SWM ordinances

Objective 10

By the year 2003, develop and adopt state wide comprehensive and effective stream channel erosion control criteria established within the regulatory framework

Objective 11

By the year 2003, all local governments and state agencies will be implementing effective development options and economic incentives for the preservation of natural stream channels and stream channel buffers

Objective 12

By the year 2005, ensure that 85 per cent of SWM BMP facilities are tracked administratively and properly maintained

Objective 13

By the year 2003, provide guidance on the permit requirements associated with the environmental impacts of stormwater management ponds

Long-term Goal 3 - New and Existing Developed Surfaces

Adequately address nonpoint source pollutants related to new and existing developed surfaces

Objective 14

By 2005, develop a comprehensive statewide mandate for the local adoption of comprehensive SWM ordinances which include water quality provisions

Objective 15

By the year 2003 develop technical and administrative guidelines for the development of watershed studies and implementation plans

Objective 16

By the year 2004 establish state wide planning and development guidelines and strategies such as "Low Impact Development" and "Innovative Site Design Techniques" which specifically minimize the impacts of development on water quality

Objective 17

By the year 2003 provide enforcement tools to ensure effective local implementation of local water quality mandates

Objective 18

By the year 2005, 85 per cent of Virginia's local government adopted SWM programs will be fully consistent with the state's minimum standards of effectiveness

Objective 19

By the year 2002, develop an educational outreach

program utilizing a variety of communication media directed at providing the general public with a basic overall understanding of nonpoint source pollution as it relates to urban activities such as lawn care, pets, household chemicals and cleaning agents etc.

Objective 20

By the year 2005 ensure that 85 per cent of SWM BMP facilities are tracked administratively and properly maintained

Objective 21

By the year 2005, establish minimum guidelines for controlling nonpoint source pollution from pervious areas

Objective 22

By the year 2001, develop a statewide tracking database/spreadsheet which incorporates DEQ, DCR, and CBLAD local program and permit tracking information

Objective 23

By the year 2003, ensure that state agencies which are responsible for resource protection related to regulated land-disturbing activities operate in an efficient and coordinated fashion through the development and implementation of an operational Memorandum Of Understanding (M.O.U.)

Long-term Goal 4 - On-Site Sewage Disposal Systems

Adequately address nonpoint source pollutants related to new and failing on-site sewage disposal systems

Objective 24

By the year 2002, develop and implement comprehensive septic system maintenance entity for policies and procedures for onsite sewage disposal systems

Objective 25

By the year 2005, develop mechanisms, framework, and tracking systems in order to assess failing systems and actual pollutant loading

Objective 26

By the year 2003, develop and present statewide onsite sewage disposal educational programs in cooperation with local governments

MONITORING & TRACKING

Long-term Goal

The overall goal of Virginia's nonpoint source pollution monitoring and tracking programs is to support the development, implementation and evaluation of the nonpoint source pollution management program. Monitoring and tracking measure the effectiveness of the management program to ensure that the beneficial uses of Virginia's waters are attained and maintained

Objective 1

Evaluate the state's waters for nonpoint source pollution-related problems

Objective 2

Evaluate the state's waters, on a watershed basis, for NPS pollution related problems to assist in targeting NPS pollution prevention activities

Objective 3

Coordinate with other public/private groups that contribute to the state's understanding of NPS pollution related issues

Objective 4

Prioritize watersheds based on the potential of adverse impacts due to NPS pollution

Objective 5

Determine the effectiveness of NPS pollution control projects, programs, or strategies across various geographical scales (river basin to watershed to site-specific)

Objective 6

Investigate and determine NPS pollution related contributions or potential contributions on groundwater statewide

Objective 7

Improve support and use of citizen monitoring resources

RESOURCE EXTRACTION

Long-term Goal

To improve surface and ground water quality in watersheds throughout the Commonwealth of Virginia by reducing nonpoint source pollution associated with abandoned and orphaned resource extraction sites in 20 - 25 sub-watersheds for the purpose of obtaining designated uses. This can be accomplished through proper site planning, implementation of best management practices, acid mine drainage remediation and land reclamation activities in associated high priority watersheds or areas with identified impaired stream segments.

Objective 1

Determine the magnitude and quantity of nonpoint source pollution impacts to the environment from abandoned coal mines, orphaned mineral mine sites, and orphaned gas and oil wells so that reclamation activities can be prioritized

Objective 2

Continue and enhance, where possible, the reclamation of abandoned coal mines, orphaned mineral mines, and orphaned gas and oil sites with the greatest potential for reducing nonpoint source pollution to surface and ground water from TSS, heavy metals, and acid mine drainage (low pH), that impact the health and safety of residents and living resources of Virginia

Objective 3

Support and develop research and education activities to improve the knowledge and understanding of Virginia residents regarding resource extraction activities and the environment

Objective 4

Identify opportunities for developing partnerships with state and federal agencies and other interested organizations to address nonpoint source pollution from abandoned mines

HYDROMODIFICATION

Long-term Goal

Adverse effects of hydrologic modifications on water quality throughout the Commonwealth of Virginia will be minimized by using proper design methodologies and best management practices (BMPs)

Objective 1

Improve the design, implementation and maintenance of BMPs installed throughout the Commonwealth

Objective 2

Strengthen and improve design standards, specifications and measures implemented for streambank restoration projects throughout the commonwealth

Objective 3

Identify streams throughout the commonwealth that have nonpoint source pollution problems related to channelization, channel instability or streambank erosion.

Objective 4

Develop and implement minimum instream flow regulations for all streams in Virginia

Objective 5

Identify dredging and instream sand mining projects throughout the state that may contribute to nonpoint source pollution.

GRANT AND TECHNICAL ASSISTANCE COORDINATION

Long-term Goal 1

To achieve maximum water quality benefits from available grant funds.

Objective 1

By the FY2001 grant cycle, DCR, DEQ, Chesapeake Bay Local Assistance Department (CBLAD), and other cooperating state and federal agencies will establish a structure and process to ensure that grant projects are reviewed consistent with appropriate technical and programmatic expertise

Objective 2

By the FY 2001 grant cycle, cooperating state and federal agencies will establish consistent grant schedules and ensure that project sponsors are aware of funding opportunities

Objective 3

By the FY 2001 grant cycle, cooperating state and federal agencies will develop a formal process to enhance project coordination between different grant programs, and to help target projects through the most appropriate funding source

Objective 4

By the FY 2002 grant cycle, cooperating agencies will work to ensure that watershed project proposals are well connected to other watershed activities and that a plan of actions exists.

Long-term Goal 2

By 2005, ensure that technical assistance and support needed to achieve maximum water quality benefits is established.

Objective 5

By 2004, cooperating state and federal agencies will assess existing technical assistance programs to ensure they have adequate staffing to meet program demands.

Objective 6

By 2005, cooperating state and federal agencies will take steps to increase awareness and visibility of technical assistance programs

Long-term Goal 3

Develop new public-private partnerships to enhance funding for ongoing nonpoint source program initiatives and implementation activities

Objective 7

By 2002, the Department of Conservation and Recreation will expand the efforts of the community development program to secure funding from philanthropic and corporate foundations to support nonpoint source pollution control activities

COASTAL NONPOINT SOURCE POLLUTION CONTROL PROGRAM

Long-term Goal (15 years)

To ensure that all applicable management measures and additional measures to reduce nonpoint source pollution are implemented by 2014 for the purpose of attaining designated uses

Irrigation water management:

Objective

Improve the irrigation management skills of Virginia irrigators in order to protect Virginia's surface and groundwater resources

Forestry:

Objective

Promote and support reduced water quality impacts and the use of best management practices (BMPs) for forestry operations

Total suspended solids reductions for new development:

Objective

Develop stormwater management plans throughout the coastal zone

Priority watershed pollutant reduction and existing development:

Objective

Improve water quality in those watersheds most in

need of restoration and nonpoint source pollution reduction actions

Adequate separation distance for OSDS and limit nitrogen loadings near nitrogen limited surface waters:

Objective

Reduce existing onsite sewage disposal systems (OSDS) impacts to water quality and prevent impacts from new systems

Roads, highways, and bridge runoff systems for roads:

Objective

Reduce runoff from roads, highways, and bridges

Runoff systems for local roads not within the Chesapeake Bay Preservation Areas:

Objective

Reduce runoff from local roads outside Chesapeake Bay Preservation Areas

Stormwater runoff from hull maintenance operations:

Objective

Reduce runoff from hull maintenance facilities

Fish waste:

Objective

Reduce potential NPS pollution from improper disposal of fish waste

A process to provide sufficient technical assistance for marina development and operation:

Objective

Enhance technical assistance for development and operation to marina owners and operators.

Process to improve surface water quality and restore instream and riparian habitat through the operation and maintenance of existing modified channels:

Objective

Improve surface water quality and instream and riparian habitat.

Manage the operation of dams to protect surface water quality and instream and riparian habitat and to assess nonpoint source problems resulting from excessive surface water withdrawals:

Objective

Improve surface water quality and instream and riparian habitat.

A process to identify and develop strategies to solve existing nonpoint source pollution problems caused by streambank or shoreline erosion that do not come up for review under existing permit authorities:

Objective

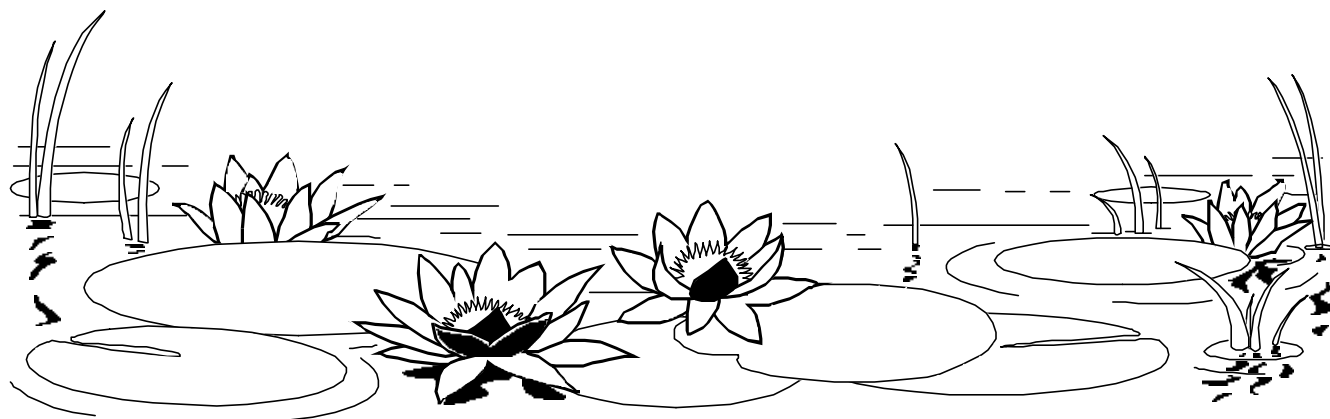
Enhance existing non-permit based streambank and shoreline erosion control programs.

A plan to assess over time the success of the management measures in reducing pollution loads and improving water quality:

Objective

Assess implementation of management measures

INTRODUCTION



PURPOSE

Pursuant to U. S. Environmental Protection Agency (EPA) guidance issued in May 1996 and subsequently during 1998, Virginia has updated its nonpoint source (NPS) pollution management program. This program update was developed by the Virginia Department of Conservation and Recreation (DCR) in cooperation with other state, federal, regional and local agencies and organizations in compliance with Section 319 of the Clean Water Act of 1987.

The management program identifies statewide management programs designed to quantify, control and limit the effects of nonpoint source pollution on the attainment of water quality standards and goals as identified by the Virginia Department of Environmental Quality (DEQ) and the Federal Clean Water Act of 1987. The attainment of beneficial uses as measured by water quality standards compliance is the overriding purpose of control programs identified herein for nonpoint sources of pollution. The program also

REPORT STRUCTURE

identifies reportable milestones for a five-year program through which progress towards the achievement of identified goals can be reported and monitored.

The document is divided into chapters representing eight major source categories of nonpoint source pollution. For each source category a separate chapter in the management program identifies the statewide management plan goals and programs to control nonpoint source pollution from that particular source. An additional chapter is also included to address the coastal nonpoint source pollution control program. Responsible agencies and management strategies to be utilized for source control as well as reportable milestones to monitor progress are identified.

DEFINITION OF NONPOINT

SOURCE POLLUTION

Many definitions of nonpoint source pollution can be found in technical and general publications. For the purpose of this management program and for the purpose of implementing the nonpoint source provisions in the Clean Water Act, nonpoint source pollution is defined in EPA guidance as follows:

Nonpoint Source Pollution (NPS) pollution is caused by diffuse sources that are not regulated as point sources and normally is associated with agricultural, silvicultural and urban runoff, runoff from construction activities, and other sources. Such pollution results in the human-made or human-induced alteration of the chemical, physical, biological, and radiological integrity of water. In practical terms, nonpoint source pollution does not result from a discharge at a specific, single location (such as a single pipe) but generally results from land runoff, precipitation, atmospheric deposition, or percolation. It must be kept in mind that this definition is necessarily general; legal and regulatory decisions have sometimes resulted in certain sources being assigned to either the point or nonpoint source categories because of considerations other than their manner of discharge.

OVERALL NONPOINT SOURCE MANAGEMENT RESPONSIBILITY

DCR has overall statewide responsibility for implementing the management program and

coordinating Section 319 NPS programs with the cooperation of the individual agencies and organizations represented herein for implementing specific nonpoint source control activities. These other state, federal and local agencies play a significant role in implementing individual portions of this management program. In addition to agencies identified in this document, there are numerous other agencies, environmental groups, citizen advisory groups, professional associations and many other public and private groups involved in implementation of nonpoint source programs.

DEQ administers all point source pollution control programs. As such, it is responsible for establishment of water quality standards for surface and ground water, monitoring of streams to measure compliance with water quality standards, and overall water quality management. DCR works closely with DEQ to ensure that the nonpoint source pollution control programs are consistent with programs required to achieve compliance with the state's water quality standards and goals and the requirements of the Clean Water Act. Coordination includes selection of monitoring stations to characterize nonpoint source water quality impacts, special nonpoint source related water quality studies, identification of priority water bodies affected by nonpoint source-generated pollutants, fall line monitoring to define nonpoint source loading trends to Virginia's tributaries to the Chesapeake Bay, annual evaluation of water quality monitoring data to detect changes in water quality or water quality standards violations more rapidly and enforcement of the Water Control Law against identified nonpoint source polluters as required.

DCR prepares an annual report to the Environmental Protection Agency concerning progress made in the implementation of this program as well as an evaluation of any necessary modifications as required. The management program will continue to be a working document subject to further refinement and modification as newer and/or better information relative to nonpoint source pollution problems and their control in Virginia become available. Additionally, a five year program evaluation is anticipated.

VIRGINIA'S NONPOINT SOURCE MANAGEMENT PROGRAM BACKGROUND



THE CLEAN WATER ACT

The Clean Water Act of 1987, Section 319, required states to assess their state waters and identify those that are adversely affected by nonpoint sources (NPS) of pollution. In addition, identification of state management programs to control NPS pollution was required. The three key components of the Clean water Act are:

- NPS assessment reporting
- NPS program funding
- NPS program development and implementation

Nonpoint Source Assessment Report

As required by the Clean Water Act, the Department of Conservation and Recreation (DCR) completed Virginia's first NPS pollution assessment in 1988, with subsequent updates and refinements in 1993 and 1996. The assessment ranks the state's 494 hydrologic units for potential NPS pollution, based on land use, livestock population, forest harvesting, disturbed urban acreage, best management practices (BMPs) implementation and erosion rates. The rankings are used to direct the implementation of Virginia's NPS pollution control programs, as well as cost-share and Section 319 funding, to the highest priority watersheds (watersheds with greatest pollution potential).

NPS Management Program Funding

Pursuant to Section 319 of the Clean Water Act, Virginia is awarded grant funds to implement NPS programs. DCR administers Section 319 funding, in coordination with the Nonpoint Source Advisory Committee (NPSAC), for watershed projects, demonstration and educational programs, NPS pollution control program development, and technical and program staff. DCR reports annually to the United States Environmental Protection Agency (EPA) on the progress made in NPS pollution prevention and control. DCR also administers EPA grant funds provided through the Chesapeake Bay Program for the implementation of nonpoint source projects within the Chesapeake Bay drainage basin.

Section 319 of the Clean Water Act of 1987 authorized specific funding for implementation of state management programs. The Clean Water Action Plan provides for additional funding for states that achieve "enhanced benefits" status. This is accomplished through development of Unified Watershed Assessments, Watershed Restoration Action Strategies and program updates. Completion and approval of these activities could result in a substantial increase in funding from the current \$2 million to \$4 million.

In addition, Virginia has received Chesapeake Bay Implementation Grant funding since 1986. Current funding for this program is approximately \$2.5 million

from EPA under Section 117 of the Clean Water Act. These funds are specifically authorized for implementation activities related to the Chesapeake Bay drainage basin. This drainage basin covers approximately 60 percent of Virginia. These funds have been mainly used to support agricultural nonpoint source programs.

Another major source of funding for implementation of this management program has been the state legislature. In 1997 the Virginia General Assembly enacted the Water Quality Improvement Act. This legislation authorized substantial funding for the Water Quality Improvement Fund. With strong support from Virginia's Executive Branch, a total of approximately \$31 million has been appropriated for nonpoint source pollution control activities through fiscal year 2000.

Many other sources of funding exist and are being utilized to implement portions of this management program. Sources of funding for each section of this program are identified within the chapters of this document. Beyond the additional funds being provided for implementation activities, the total funding for nonpoint source programs in Virginia includes a portion of each agency's operating budget for nonpoint source pollution control implementation.

As the lead agency in Virginia for NPS pollution control programs, DCR also coordinates other nonpoint source initiatives, such as the Chesapeake Bay Program and the Coastal Nonpoint Source Pollution Control Program.

CLEAN WATER ACT AMENDMENTS

In 1987, Congress enacted section 319 of the Clean Water Act. Section 319 establishes a national program to control nonpoint sources of water pollution. Nonpoint source pollution is caused by rainfall or snowmelt moving over and through the ground carrying pollutants to surface and ground waters. Atmospheric deposition and hydrologic modification also contribute to nonpoint source pollution.

Under section 319, states address nonpoint source

pollution by developing NPS assessment reports that identify NPS pollution problems and the nonpoint sources responsible for the water quality problems. States also adopt management programs to control NPS pollution and then implement the management programs. Section 319(h) provides for EPA's award of grants to states to help them to implement those management programs. Both the assessment report and management program must be approved by EPA in order for a state to be eligible for section 319(h) funds.

Nonpoint source pollution management programs are required to meet the statutory requirements of the Clean Water Act Amendments and should address additional requirements resulting from future EPA program guidance.

CLEAN WATER ACTION PLAN

The Clean Water Action Plan (CWAP) was released in February 1998 to provide a blueprint for restoring and protecting the nation's water resources. As stated in the document, "A key element in the Action Plan is a new cooperative approach to watershed protection in which state, tribal, federal, and local governments, and the public first identify the watersheds with the most critical water quality problems and then work together to focus resources and implement effective strategies to solve those problems. The Action Plan also includes new initiatives to reduce public health threats, improve the stewardship of natural resources, strengthen polluted runoff controls, and make water quality information more accessible to the public."

To support implementation of CWAP, additional money is available from EPA for the Section 319 NPS management program. This additional money is referred to as "enhanced" program funding and is in addition to what Virginia normally receives for the management program. In order to receive this additional money a state must first achieve "Enhanced Benefits Status." This is accomplished by updating the statewide NPS Management Program to address the nine key elements (described in the Federal Guidance chapter of this document) for all significant nonpoint

sources of pollution.

The incremental funding is intended to focus on watershed restoration action strategies for Category I waters which were identified through the Unified Watershed Assessment and Restoration Priorities process. Virginia completed its assessment in 1998. There are four assessment categories as described below:

- C Category I - Watersheds in need of restoration. Watersheds that do not now meet, or face imminent threat of not meeting clean water and other natural resource goals.
- C Category II - Watersheds meeting goals, including those needing action to sustain water quality. These watersheds meet clean water and other natural resource goals and standards, and support healthy aquatic systems.
- C Category III - Watersheds with pristine/sensitive aquatic system conditions on lands administered by federal, state, or tribal governments. These areas include currently designated and potential Wilderness Areas, Outstanding Natural Resource Waters, and Wild and Scenic Rivers.
- C Category IV - Watersheds with insufficient data to make an assessment. These watersheds lack significant information, critical data elements, or the data density needed to make a reasonable assessment at this time.

Watersheds within Virginia were classified either as Category I or Category II waters. Of the state's 48 watersheds presented in the assessment, 39 were classified as Category I and 9 were classified as Category II. Based on the assessment methodology no watersheds were classified as Category III or Category IV.

Pursuant to the Clean Water Action Plan, guidelines were provided for fiscal year (FY) 1999 Section 319 funding. These guidelines apply to the award and use of any Section 319 funds that are appropriated by the U.S. Congress in excess of \$100 million originally authorized by Congress. In the discussion below, the funds exceeding \$100 million are referred to as

"incremental Section 319 grant funds."

- C Allocation Formula: EPA will use the existing Section 319 allocation formula to initially allocate any incremental Section 319 grant funds to states, territories and tribes. These initial allocations may be modified as explained in the following paragraph.
- C Completion of Unified Watershed Assessments and Watershed Restoration Priorities: The incremental Section 319 grant funds are being provided to help states, territories and their partners implement Watershed Restoration Action Strategies for watersheds identified in Unified Watershed Assessments. Therefore, incremental grant funds will be allocated only to states and territories that have completed their Unified Watershed Assessments and their Watershed Restoration Priorities by October 1, 1998. If any state or territory has failed to complete its Unified Watershed Assessment and Watershed Restoration Priorities by that date, EPA will distribute its allocation to all other states and territories that have completed their Unified Watershed Assessments and Watershed Restoration Priorities in accordance with the Section 319 allocation formula.
- C Use of Incremental Funding: Incremental Section 319 funds are subject to the same eligibility criteria and requirements as all other Section 319 funds. Thus states must meet for these funds the basic legal and program requirements that are set forth in Section 319 and in the May 1996 Nonpoint Source Program and Grants Guidance with regard to all Section 319 grants.
- C Updating and Refining Nonpoint Source Programs and Assessments: Beginning in FY 1999, states and territories are authorized to use up to 20 percent of their entire Section 319 allocation to upgrade and refine their nonpoint source programs and assessments. States and territories may use these funds for any of the broad set of assessments and program development purposes outlined in detail on page 21 of the May 1996 guidance except that the incremental portion of this 20 percent (i.e., 20

percent of the appropriations that exceed the base allocation of \$100 million) must be focused particularly on activities that will assist in the implementation of Watershed Restoration Action Strategies. A prominent example of such activities is the development of total maximum daily loads (TMDLs) to help implement a Watershed Restoration Action Strategy.

CHESAPEAKE BAY PROGRAM

The federal Chesapeake Bay Program is another vital component of Virginia's Nonpoint Source Pollution Management Program. As the designated lead nonpoint source pollution control agency, the Virginia Department of Conservation and Recreation has a key role in implementing Virginia's Chesapeake Bay Program. This is accomplished in several ways, including participating in committees and workgroups of the Chesapeake Bay Program in Annapolis, Md., and developing nonpoint source pollution implementation alternatives for Virginia's Chesapeake Bay tributaries.

As part of Virginia's efforts to help achieve the nutrient reduction goals for the Chesapeake Bay, nutrient reduction strategies are being developed for each of Virginia's Chesapeake Bay tributaries. DCR, working in cooperation with the Virginia Department of Environmental Quality and the Chesapeake Bay Local Assistance Department, is the lead agency for developing the nonpoint source portion of Virginia's Tributary Strategies.

DCR also administers the Bay Program NPS pollution implementation grant. Virginia receives approximately \$2.5 million in federal funding for the agricultural cost-share program, for NPS program implementation efforts within the Chesapeake Bay watershed and for soil and water conservation districts for program implementation. These elements are all part of the larger effort dedicated to nonpoint source pollution program activities statewide.

Chesapeake Bay Agreement

The Chesapeake Bay Program is the unique regional partnership responsible for directing and conducting the restoration of the Chesapeake Bay since the signing of the historic 1983 Chesapeake Bay Agreement. The Chesapeake Bay Program partners include the states of Maryland, Pennsylvania and Virginia; the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; the Environmental Protection Agency, representing the federal government; and participating advisory groups.

As the largest estuary in the United States and one of the most productive in the world, the Chesapeake was this nation's first estuary targeted for restoration and protection. In the late 1970s, scientific and estuarine research on the bay pinpointed three areas requiring immediate attention: nutrient over-enrichment, dwindling underwater bay grasses and toxic pollution. Once the initial research was completed, the Bay Program evolved as the means to restore this exceptionally valuable resource.

Since its inception in 1983, the Chesapeake Bay Program's highest priority has been the restoration of the bay's living resources - its fin fish, shellfish, Chesapeake Bay grasses, and other aquatic life and wildlife. Improvements include fisheries and habitat restoration, recovery of Chesapeake Bay grasses, nutrient and toxic reductions, and significant advances in estuarine science.

Examples of specific actions initiated by the Chesapeake Bay Program include a watershed-wide phosphate detergent ban, the introduction of agricultural best management practices, Biological Nutrient Removal at wastewater plants, and a public education campaign emphasizing the role each of the watershed's 15 million residents play in the restoration.

Considered a national and international model for estuarine research and restoration programs, the Bay Program is a partnership led by the Chesapeake Executive Council. The members of the Executive Council are the governors of Maryland, Virginia and Pennsylvania; the mayor of the District of Columbia; the administrator of the EPA and the chairman of the Chesapeake Bay Commission. The Executive Council meets annually to establish the policy direction for the bay and its living resources.

In 1987, Virginia joined the other Chesapeake Bay Program participants in committing to reduce the controllable flow of nutrients in the Chesapeake Bay by 40 percent by the year 2000. Each tributary to the bay has different characteristics, so each requires site-specific, unique cleanup strategies. Virginia's strategy for the Potomac River basin is complete. Initial strategies for the James and York river basins are available, as well as a progress report on the Rappahannock River Basin Strategy. Final strategies for these three river basins and Virginia's small coastal basins will be developed once scientific studies are completed and nutrient reduction targets are set.

Tributary Strategies

Initially, tributary strategy development focused on nutrient reduction because nutrient over enrichment is one of the major threats to the health of the Chesapeake Bay and its tributary rivers. Excess nutrients in the form of nitrogen and phosphorus can lead to overproduction of algae and oxygen-starved waters as algae decompose. However, as better information became available through monitoring and modeling efforts, it became clear that excessive sediment and total suspended solids were also causing serious water quality problems. As a result, tributary strategy development in the lower bay tributaries address both nutrients and sediments.

Due their location within the Chesapeake Bay watershed, the Potomac River and other northern bay tributaries have a significant direct impact on nutrient levels within the main stem of the Chesapeake Bay. Therefore, a 40 per cent nutrient reduction goal was established for the Potomac River consistent with the overall goal for the Chesapeake Bay. No sediment goal has yet been established for the Potomac and Shenandoah rivers.

The connection between the lower Chesapeake Bay tributaries (Rappahannock, York, and James rivers) and nutrient levels in the main stem of the Chesapeake Bay is far less clear. In fact, the lower tributaries may have minimal impact on nutrient levels in the main stem of the bay. As a result, nutrient reduction goals for the lower tributaries will be based on what is needed to restore and maintain the health of each individual river. Each tributary is unique and has different water quality needs.

Also, the desired and actual use of each tributary varies significantly. Therefore, different solutions will be required to target the unique needs of each tributary. By targeting local issues and concerns, tributary strategies can be developed that are cost-effective, equitable and practical.

The Tributary Strategy process is intended to address both nonpoint and point sources of pollution. Through an assessment process, existing efforts to control nonpoint and point sources of pollution will be evaluated and opportunities for achieving additional nutrient or sediment reductions will be identified.

Although the focus of each regional strategy will be on what control options are best suited for that region, the goal setting process will be basin-wide. This focus is based largely on the availability of accurate and reliable data derived from the Chesapeake Bay Watershed and Water Quality models.

A major component of the Chesapeake Bay Program has been the development of computer models that are used to help understand the water quality problems facing the Chesapeake Bay and its tributary rivers. The Watershed Model uses land use information along with monitoring information and delivery factors to help determine the relative contributions of various sources of nutrients and sediments. The Water Quality Model is a predictive model that can help determine dissolved oxygen and other water quality and living resource improvements that can be anticipated in response to nutrient and sediment reductions. In other words, it can help predict how living resources may respond to changes in water quality. This complex, three-dimensional model can simulate the chemical, physical, and biological dynamics of the Chesapeake Bay and its tributary rivers.

NONPOINT SOURCE ADVISORY COMMITTEE

To help develop and implement Virginia's Nonpoint Source Pollution Management Program, DCR coordinates the Nonpoint Source Advisory Committee (NPSAC). It comprises representatives from all state and

federal agencies having significant responsibility for NPS pollution control. The committee developed Virginia's first management program in 1988. Goals and milestones for controlling various sources of NPS pollution were updated in 1992 and 1994.

The Virginia Nonpoint Source Pollution Management Program is coordinated by the DCR as set forth in Section 10.1-104.1 of the *Code of Virginia*. This role includes the oversight of program development and implementation and interfacing with EPA to ensure that Virginia's program is in conformance with the requirements of the Clean Water Act of 1987. DCR is also responsible for the management and distribution of federal and state funds for program implementation. DCR performs these duties with the assistance and guidance of the NPSAC.

The mission of this committee is to be an interagency forum to facilitate effective implementation of nonpoint source pollution programs in Virginia, and to achieve

and maintain beneficial uses of water throughout the commonwealth. NPSAC comprises representatives of the following agencies:

Chesapeake Bay Local Assistance Department
Department of Agriculture and Consumer Services
Department of Conservation and Recreation
Department of Environmental Quality
Department of Forestry
Department of Game and Inland Fisheries
Department of Health
Department of Mines, Minerals and Energy
Department of Transportation
Virginia Cooperative Extension
Virginia Marine Resources Commission
USDA Farm Services Agency
USDA Forest Service
USDA Natural Resources Conservation Service
US Fish and Wildlife Service
US Geological Survey

FEDERAL GUIDANCE

EPA NONPOINT SOURCE POLLUTION MANAGEMENT PROGRAM GUIDANCE

In recent years EPA has developed and distributed to states several guidance documents to be used for updating NPS management programs. The guidance supports a watershed approach to addressing NPS pollution. The watershed approach provides a framework for coordinating public and private sector efforts to address the highest priority water-related problems within geographic areas, considering both surface and ground water flow. The watershed approach is commonly characterized by four key principles:

- C well integrated partnerships;
- C a specific geographic focus;
- C action driven by environmental objectives and by strong science and data; and
- C coordinated priority setting and integrated solutions.

Nine Key Elements

Federal guidance issued in 1996 set forth nine key elements that state nonpoint source pollution management programs should address. Subsequent guidance issued in response to the Clean Water Action Plan in 1998 (*Approval Process for Management*

Program Upgrades) requires that states update nonpoint source pollution programs in accordance with these nine key elements in order to be eligible for enhanced funding benefits. The following is a description of how Virginia's program addresses these key program elements.

1. *The state program contains explicit short- and long-term goals, objectives and strategies to protect surface and ground water.*

Virginia has established a clear vision of how to implement programs to effectively control nonpoint source pollution. This vision will be accomplished through implementation of specific short-term and long-term goals as articulated in subsequent sections of this document. These goals are intended to achieve and maintain the beneficial uses of water. In support of these goals, Virginia has identified a series of specific strategies and tasks to guide and direct program implementation and measure program success.

2. *The state strengthens its working partnerships and linkages with appropriate state, tribal, regional, and local entities (including conservation districts), private sector groups, citizens groups, and federal agencies.*

Virginia's networked approach to program development

and implementation requires strong working partnership among local, state, and federal agencies, soil and water conservation districts, and private sector and citizens groups. The strength of these partnerships is reflected in the levels of participation in the Nonpoint Source Advisory Committee and in the working groups formed to update the state management program.

As described in the preceding chapter, the Nonpoint Source Advisory Committee (NPSAC) is an interagency forum designed to facilitate effective implementation of nonpoint source pollution programs. NPSAC meets bimonthly to promote collaborative decision making and program coordination. NPSAC's role is central to many of the recommendations presented in this document. As such, it is anticipated that this role will broaden and further strengthen Virginia's working partnerships.

Partnerships with soil and water conservation districts support and implement nonpoint source pollution reduction efforts by working with property owners to develop easements, implement conservation plans, and install best management practices (BMPs). Meetings and workshops are conducted throughout the state by partnering with districts and local governments to enhance the awareness of public officials, property owners, and the general public of how important the installation of BMPs is to improving water quality. Furthermore, various environmental programs such as Save Our Streams (SOS) allow for the development of partnerships with citizen groups such as the Izaak Walton League of America, Friends of the Rappahannock, the James River Association, and others. Partnering with citizen groups has resulted in the collection of important water quality data to be used by the state to determine the health of its waters.

There has been extensive public involvement in the update of Virginia's Nonpoint Source Pollution Management Program through participation in work groups formed to develop recommendations contained in this document. Additional opportunities to develop and strengthen partnerships are provided through specific program elements. For example, there is strong public involvement in developing and implementing watershed management plans.

3. *The state uses a balanced approach that emphasizes both state-wide nonpoint source*

pollution control programs and on-the-ground management of individual watersheds where waters are impaired and threatened.

Virginia's evolving watershed management programs complement and strengthen the existing well developed state NPS pollution control programs. This balanced approach enables the commonwealth to address both specific watershed and statewide priorities. Virginia's watershed management programs address both sub-basin and basin-wide priorities and provide a framework for integrating federal, state, and local water quality and natural resource programs.

While Section 319 -funded activities continue to play an important role in addressing nonpoint source pollution in Virginia, this program is just one of several within the state. Through enactment of the Water Quality Improvement Act the state has committed an unprecedented level of funding to expand and strengthen water quality programs.

4. *The state program (a) abates known water quality impairments from nonpoint source pollution and (b) prevents significant threats to water quality from present and future activities.*

Through total maximum daily load development (TMDL) and implementation, Virginia has the institutional mechanism in place to address known water quality impairments. Through ongoing program implementation and basin-wide planning and management efforts, Virginia is working to prevent future impairments. The TMDL process allows Virginia to comprehensively characterize water quality impairments and threats throughout the state.

Virginia has well developed and effective laws and regulations to address all major source categories of

NPS pollution. While some of the actions presented in this document will enhance the effectiveness of these laws and regulations, Virginia has made significant strides in addressing NPS pollution. In fact, the review of Virginia's coastal NPS pollution control program by federal agencies has confirmed Virginia's leadership in addressing difficult NPS issues related to agriculture and forestry.

5. *The state program identifies waters and their watersheds impaired by nonpoint source pollution and identifies important unimpaired waters that are threatened or otherwise at risk. Further, the state establishes a process to progressively address these identified waters by conducting more detailed watershed assessments and developing watershed implementation plans, and then by implementing the plans.*

Virginia's Water Quality Information, Restoration and Monitoring Act states that "the 303(d) and 305(b) reports will provide an accurate and comprehensive assessment of the quality of state surface waters and will provide a basis for developing initiatives and programs to address current and potential water quality impairment. Monitoring shall be conducted so that it establishes consistent siting and monitoring techniques, expands the percentage of river and stream miles monitored, monitors for all substances listed on EPA's 307(a) list, provides for increased sediment, macro invertebrate, benthic organism and fish tissue monitoring, increases frequency of sampling and utilizes announced and unannounced inspections."

This act also requires the development and implementation of a plan to achieve full supporting status for impaired waters. This plan shall include date of expected achievement of water quality objectives, measurable goals, necessary corrective actions, associated costs, benefits and environmental impact of addressing impairments.

Land use information is used to help establish watershed priorities and assess NPS pollution potential through the NPS assessment program. In addition, land use information is incorporated into modeling efforts for the Tributary Strategy process and the Chesapeake Bay

Program. As previously stated, NPSAC provides a forum for information exchange and communication of program planning and implementation activities among water resource management agencies.

Avenues for public participation are provided through several program development activities. An excellent example of this is the Tributary Strategy process. This process involved extensive participation from local, state and federal agencies, private organizations, environmental groups, and private citizens through dozens of meetings within each river basin. This process has helped establish a consensus targeting watershed-based restoration activities. Through various reporting, monitoring and tracking requirements periodic reviews will allow for refinement of program priorities.

6. *The state reviews, upgrades and implements all program components required by section 319(b) of the Clean Water Act, and establishes flexible, targeted and iterative approaches to achieve and maintain beneficial uses of water as expeditiously as practicable.*

(a) A mix of water quality-based and/or technology-based programs designed to achieve and maintain beneficial uses of water; and

(b) A mix of regulatory, non-regulatory, financial and technical assistance as needed to achieve and maintain beneficial uses of water as expeditiously as practicable.

Virginia has a broad range of water quality-based and technology-based programs that collectively help to attain and maintain beneficial uses of state waters. As described in the source category chapters of this document, Virginia has a number of regulatory, non-regulatory, financial and technical assistance tools that support efforts to achieve and/or maintain the beneficial uses of Virginia waters.

Through development of Virginia's Coastal Nonpoint Source Pollution Control Program a compendium of state laws, regulations, technical and financial assistance programs was submitted to EPA and the National Oceanic and Atmospheric Administration

(NOAA). Program development is required only of states with approved Coastal Resource Management Programs. In addition, new and revised laws and regulations are presented in this update document.

NPS program implementation is identified through the description of goals, objectives, strategies and tasks described within each chapter of this document. The ability to measure implementation will be directly correlated to accomplishment of the individual strategies and tasks. This information is presented in tabular format that includes funding sources, lead and cooperating agencies and target dates for completion.

7. *The state identifies federal lands and activities which are not managed consistently with state nonpoint source pollution program objectives. Where appropriate, the state seeks EPA assistance to help resolve issues.*

The Department of Environmental Quality (DEQ) administers the Virginia Coastal Resources Management Program and is the lead agency in Virginia for reviewing and responding to federal consistency determinations and certifications in Virginia. Although federal consistency review is limited to the Virginia Coastal Zone, major federal actions throughout the state are subject to environmental impact review and permit review.

As part of the federal consistency review process, DEQ consults with appropriate state agencies and institutions, as needed. If DEQ finds that a proposed activity is inconsistent with the management program, DEQ works with the federal agency and other interested parties, in accordance with federal consistency provisions, to bring the activity into compliance with state law and regulations.

Federal Activities

Federal agencies are responsible for determining whether federal activities directly affect the state's coastal area and whether those activities are consistent, to the maximum extent practicable, with the state's approved program. All other types of federal activities within the state are subject to federal agency review to determine whether they directly affect the coastal area.

Consistency review determinations made by federal agencies for activities directly affecting the coastal zone are submitted to DEQ.

Federal agencies are required to notify the state of proposed activities that will directly affect the coastal zone, and must provide DEQ with a consistency determination as soon as possible, preferably when the analysis of alternatives is still in the planning stage. The consistency determination must be provided to DEQ no later than 90 days before final approval of the activity. If a federal agency decides that a consistency determination is not required because the federal activity does not directly affect the coastal area, the federal agency shall notify DEQ, briefly setting forth the reasons for its negative determination.

When a proposed federal activity will involve the National Environmental Policy Act (NEPA) process, the agency must provide DEQ with all applicable NEPA documents, as part of its obligation to provide adequate information for DEQ's review of the agency's consistency determination. In such cases, DEQ's review process will not begin until an environmental assessment of a draft Environmental Impact Statement has been provided to DEQ. During the development of NEPA documentation, DEQ encourages federal agencies to consult with the state at the earliest possible time.

Permitted Activities

Federal regulations (15 CFR 930.50 et seq.) require that applicants for federal licenses or permits for activities affecting any land or water use in the coastal area, or for certain renewals or amendments to such licenses or permits, shall provide the federal permitting agency with a certification that the proposed activity is consistent with the state coastal program. At the same time, federal regulations (15 CFR 930.57) require that the applicant transmit a copy of the application, with the necessary data and information for the consistency certification, to DEQ. When a proposed federal license or permit will involve the NEPA process, the applicant must provide DEQ with all applicable NEPA documents as part of the federal agency's obligation to provide adequate information for DEQ's review of the consistency certification.

Federal agencies may not issue a license or permit

unless the state concurs with the applicant's certification. DEQ evaluates the consistency certification based on state enforceable coastal policies which include NPS programs.

Where a state agency has assumed the responsibility for administration of a federal license or permit program, the issuance of such a license or permit by that state agency shall constitute state concurrence with the consistency certification. In the case of VMRC and the joint permitting process for local, state and federal wetlands permits, the issuance of a state wetlands permit for any activity also requiring a Corps of Engineers' 404 permit shall constitute state concurrence with the consistency certification.

Joint Permit Review

Three types of environmental permits are issued by VMRC; (1) subaqueous or bottom lands, (2) tidal wetlands, and (3) coastal primary sand dunes permits. VMRC's authority and responsibilities are derived from Subtitle III of Title 28.2 of the *Code of Virginia* and specifically regulate physical encroachment into these valuable resource areas.

The permit process relies on a single Virginia joint local/state/federal permit application. The review process for which this application was originally designed, considers various local, state and federal statutes governing the disturbance or alteration of environmental resources. VMRC plays a central role as an information clearinghouse for all three levels of review. Applications receive independent, yet concurrent, review by local wetland boards, VMRC, DEQ and the U.S. Army Corps of Engineers.

Environmental Impact Review

DEQ coordinates the state's responses to environmental documents for proposed state and federal projects. Environmental impact review (EIR) staff distribute documents to appropriate state agencies, planning districts and localities for their review and comment. Upon consideration of all comments, staff prepares a single state response.

NEPA requires environmental impact statements or environmental assessments for certain classes of federal projects and actions. DEQ participates in three phases of the NEPA review process: scoping, draft document review, and final document review. DEQ coordinates federal intergovernmental review for all federal actions and locally sponsored projects that are federally funded. Also, all federal actions and programs that directly affect Virginia's coastal zone must be carried out in a manner that is consistent with Virginia's Coastal Resources Management Program. As described above, DEQ reviews federal projects for approved consistency during the NEPA process.

The EIR process is summarized in the following list:

2. Federal agency initiates scoping for information on natural resources and potential adverse environmental impacts of the proposal;
3. DEQ sends copies of scoping requests to appropriate state agencies and relevant divisions of DEQ;
4. DEQ sends scoping comments to federal agency;
5. Appropriate divisions of DEQ, and other state agencies, send comments directly to federal agency with copy to DEQ;
6. Federal agency develops environmental assessment (EA) or environmental impact statement (EIS) in accordance with Council on Environmental Quality (CEQ) Guidelines, issues public notice on availability of document, and establishes deadline for comments on EIS;
7. DEQ sends coordinated review requests form to appropriate DEQ reviewers, state agencies and the affected Planning District Commission (PDC) & locality;
8. DEQ establishes deadline for state review;
9. Federal agency distributes document to DEQ, state reviewing agencies, and the affected PDC & locality;
10. DEQ receives comments from reviewers, resolves conflicts, prepares Commonwealth's response, and alerts Secretary of Natural Resources (SONR) about controversial projects.
11. Federal agency responds to comments on draft document in supplemental EA or EIS or in final EA or EIS;
12. DEQ coordinates review of supplemental

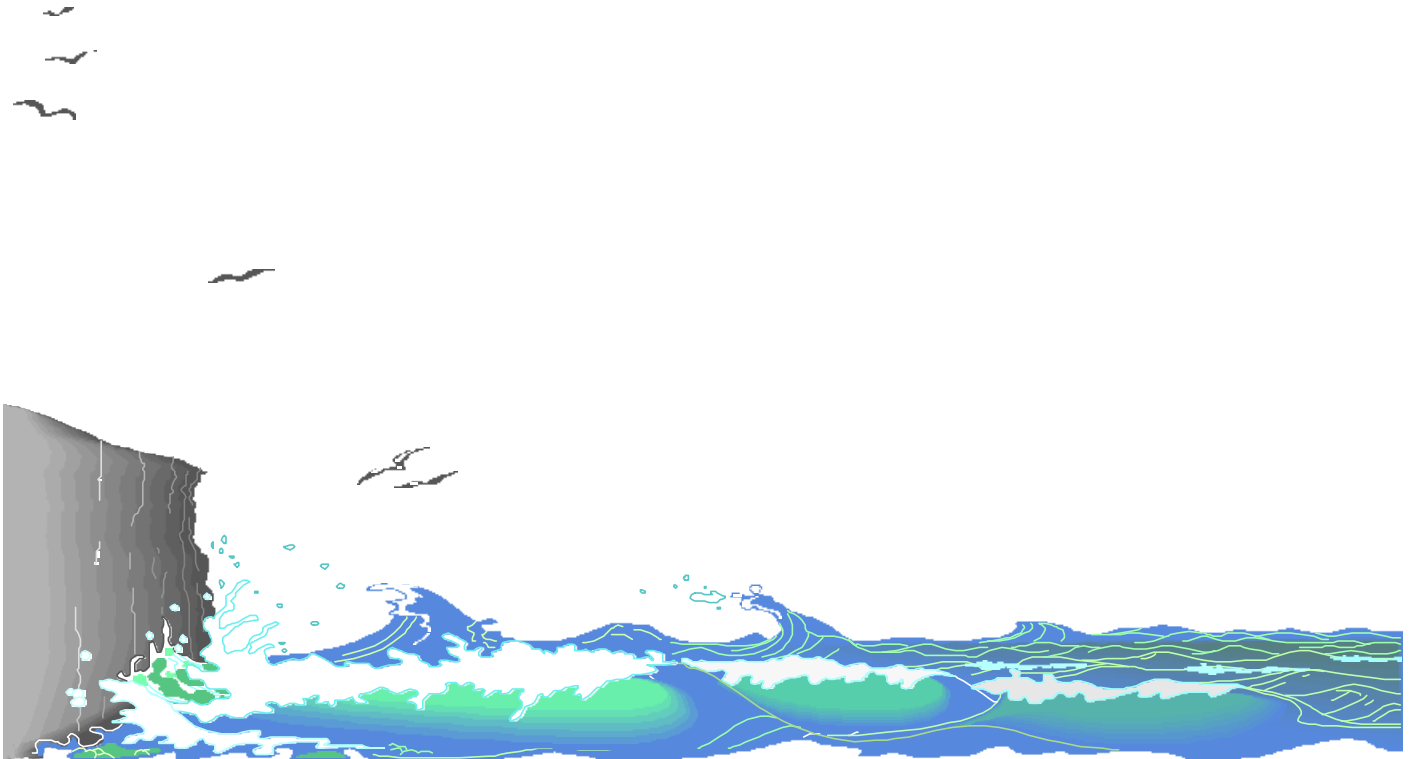
EA/EIS, resolves conflicts, and prepares commonwealth's consolidated comments;

13. Federal agency response to comments on supplemental EA/EIS in final EA/EIS.
 14. Funding of No Significant Impact (FONSI) issued and a Record of Decision generated;
 15. Federal agency proceeds with project.
8. *The state manages and implements its nonpoint source pollution program efficiently and effectively, including necessary financial management.*

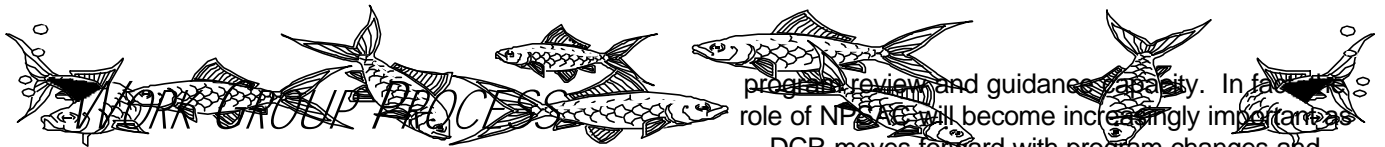
Through implementation of recommendations identified by work group participants, Virginia will realize substantial benefits for project design and implementation and improved program integration. Through an expanded BMP tracking system Virginia has increased its ability to measure environmental results and achieve improved fiscal accountability.

9. *The state periodically reviews and evaluates its nonpoint source pollution management program using environmental and functional measures of success, and revises its NPS pollution assessment and its management program at least every five years.*

Currently, Virginia has several reporting requirements that allow for assessment of state surface and groundwater characteristics and provide information pertaining to the level of potential threat or actual impairments. These monitoring efforts conducted by the state and federal agencies also allow for identification of where improvements occur. This type of evaluative information assists in determining levels of effective program implementation. Furthermore, the information provides a sound basis for refining program goals and objectives.



NPS POLLUTION MANAGEMENT UPDATE PROCESS



A working group process was used to develop this Nonpoint Source Pollution Management Program document. It started with the identification of the primary source categories to be addressed during the program update. There were eight source categories initially identified: watershed prioritization, agriculture, forestry, construction and development, monitoring and tracking, resource extraction, hydromodification, and grant and technical assistance coordination.

These categories incorporate and reflect the composition of the previous NPS management update process, the Coastal Nonpoint Source Pollution Control Program management measure categories, as well as encompassing the majority of priority issues affecting Virginia.

Facilitators of the program update were cognizant of the need to have an open process that provided opportunity for input at all stages of the process from all interested groups. Many state and federal agency staff, local government representatives, planning district commissions, interest groups, and environmental groups were able to participate in the meetings. Many others have provided written comments on materials sent out for review.

During the program update process, NPSAC was briefed several times on the status of the work groups. NPSAC members provided guidance through feedback at meetings, direct member involvement in a work group, or by having other agency staff participate in a work group. NPSAC will continue to function in a

program review and guidance capacity. In fact, the role of NPSAC will become increasingly important as DCR moves forward with program changes and implementation.

PUBLIC PARTICIPATION

Public participation was initiated by a "kick-off" meeting held by DCR in January of 1999. The meeting was well attended and was fully supported by the Virginia Secretary of Natural Resources and the Director of DCR. DCR staff compiled a mailing list of state and federal agencies, interest groups, local, state and national environmental groups, and citizens.

DCR staff sent invitation letters under the director's signature asking them to attend and participate in the update process. DCR staff described the need to conduct the program update and explained how the work groups would function and what their responsibilities would be. All work group facilitators were introduced to the attendees. In addition, those who attended received a folder containing fact sheets and a sign up sheet for the work group(s) in which they wanted to participate.

Several people contacted DCR stating they were unable to attend the meeting but were interested in participating. In response, DCR mailed meeting fact sheets and followed up with phone calls so as to include participants in the work group of their choice.

Between mid-January and the end of May more than 30 work group and facilitator meetings were held.

The work group participants identified the issues within the source categories, specified working definitions for some of the more difficult issues, identified the goals, objectives, strategies, funding sources, and implementation time frames. Participants were

provided several versions of working drafts for comments. In addition, DCR used its web site to post the meeting minutes, schedules, meeting locations and communication links with the facilitators.

WATERSHED PRIORITIZATION



LONG-TERM GOAL (10- YEAR)

Develop and fully implement a cooperative watershed management program that integrates a comprehensive basin management and targeted sub-basin approach to implementing nonpoint source pollution control

INTRODUCTION

Virginia's evolving watershed management approach includes several programs that implement nonpoint source pollution control efforts on a watershed basis. Nonpoint source pollution (NPS), or polluted runoff, results from many activities across the landscape. Water quality degradation can result when polluted runoff from land use activities such as agriculture, forestry, and construction and development is introduced into surface and groundwater. These impacts can be characterized and addressed within a given watershed by assessing chemical, biological and physical attributes. Therefore, Virginia's pollution control efforts have to be targeted toward addressing sources of pollution on a watershed basis.

There are many other recognized strengths to a watershed management approach to NPS pollution control. NPS pollution, by its nature, lends itself to a watershed approach in that nonpoint sources are generally widespread, and loading patterns to waterways are more readily measured and controlled at the watershed level. In addition, a watershed

approach offers opportunities to address a wider range of objectives, provides a framework to solve problems unique to individual watersheds, and addresses statewide water resources issues through a systematic review of all basins within the state. Also, public awareness and involvement in NPS prevention, and the opportunity for state and local cooperation is increased.

The opportunity to improve communication with the public is one of the strongest motivating factors for states to adopt a statewide watershed management approach. By developing information plans and using methods that promote public involvement (e.g., educational meetings, workshops, Adopt-A-Stream, citizen stream monitoring, etc.), watershed management can increase public awareness on water related issues and facilitate responses to citizen concerns. Watershed plans contribute to a more informed public, which can result in more realistic expectations regarding water management. Due to its increased opportunities for participation, a watershed planning approach can lead to increased public support

for state-sponsored management initiatives. Watershed management also yields new opportunities for cooperative partnerships among federal, state and local governments. By providing a common framework for management, each partner can see where it fits in and can focus its resources to complement the overall planning efforts.

Watershed management issues facing Virginia include:

- the need to improve coordination between various state and federal programs
- the need to enhance watershed prioritization efforts
- the need to streamline reporting and assessment programs

As Virginia moves forward with a watershed approach to NPS pollution control, program coordination and the ability to target resources will be key to effective implementation. Strong partnerships and interagency cooperation will be required to affect these changes.

ISSUE IDENTIFICATION & PROGRAM ASSESSMENT

Key federal watershed management initiatives and programs are described below. These programs establish a framework and provide support for state and local watershed management efforts.

Clean Water Act

Comprehensive watershed planning had its inception in the Clean Water Act (CWA). Section 303 (e) of the Clean Water Act, with its provisions for continual program planning, outlines a comprehensive and integrated approach to watershed management. Section 303 (e) requires that states have a continuing planning process for all navigable waters. Among other things, plans are to include effluent limits and incorporation of total maximum daily loads (TMDL) for pollutants, schedules for compliance with effluent limits, provisions for intergovernmental cooperation, and

adequate assurance for implementation, including schedules of compliance. Although there are differences across the country in how this section has been implemented, it provides a strong foundation for watershed management. Section 303(d) of the statute requires that states prioritize and develop total maximum daily loads (TMDLs) or other waste load allocations that will assure the attainment of water quality standards, such that designated beneficial uses are attained. Section 319, with its emphasis on NPS pollution program planning, also provides a strong incentive for watershed-based resource management efforts.

Coastal Nonpoint Source Pollution Control Program

In addition to the CWA, Section 6217 of the Coastal Zone Act Reauthorization Amendments support watershed management within Virginia's coastal zone. In particular, federal guidance issued pursuant to this statute requires states, with approved coastal resource management programs, to implement management measures which include watershed prioritization and planning. Guidance issued in October of 1998 requires states with coastal nonpoint source pollution programs to develop 15-year strategies inclusive of five-year implementation plans.

Clean Water Action Plan

The Clean Water Action Plan (CWAP) represents a major new multi-agency federal initiative to target nonpoint source (NPS) pollution control on a watershed basis. The Clean Water Action Plan, announced by President Clinton and Vice President Gore on February 19, 1998, emphasizes collaborative strategies built around watersheds and the communities they sustain. This initiative seeks to build on clean water successes and addresses three major goals:

- enhanced protection from public health threats posed by water pollution
- more effective control of nonpoint source pollution
- promotion of water quality protection on a watershed basis

In addition to encouraging watershed management, this initiative makes available substantial additional funding resources. To be eligible for these funds, states must develop a Unified Watershed Assessment (UWA) document and Watershed Restoration Action Strategies (WRAS). This initiative supports and compliments Virginia's cooperative watershed-based approach to implementing NPS pollution control programs.

Cooperative River Basin Studies

Cooperative River Basin Studies are conducted by the Natural Resource Conservation Service (NRCS) under the authority of Section 6, Public Law 83-566, the Watershed Protection and Flood Prevention Act. Section 6 of PL-566 authorizes NRCS, in cooperation with other federal, state and local agencies, "to make investigations and surveys of the watersheds of rivers and other waterways as a basis for the development of coordinated programs." This wide range of activities provides support to solve resource problems, work cooperatively with state, local and other federal agencies, and develop information and data to support other conservation programs.

State Watershed Initiatives

Several important laws passed in Virginia in recent years lend support to a watershed approach. The Water Quality Improvement Act of 1997 (WQIA; *Code of Virginia* §10.1, Chapter 21.1) "establishes cooperative programs related to nutrient reduction and other point and nonpoint sources of pollution." Virginia's Tributary Strategy Program (*Code of Virginia* §2.1-51.12:1) requires the development of strategies and written plans to restore water quality and living resources of the Chesapeake Bay and its tributaries.

Water Quality Improvement Act

A key provision of the Water Quality Improvement Act is the requirement that state agencies develop and promote cooperative watershed programs. The state has the responsibility under Article XI of the Constitution of

Virginia to protect the bays, lakes, rivers, streams, creeks and other state waters of the commonwealth from pollution and impairment. Commercial and

residential development of land as well as agricultural and other land uses may cause the impairment of state waters through nonpoint source pollution. In the exercise of their authority to control land use and development, it is the responsibility of counties, cities and towns to consider the protection of all bays, lakes, rivers, streams, creeks, and other state waters from nonpoint source pollution. The exercise of environmental stewardship by individuals is necessary to protect state waters from nonpoint source pollution. To promote cooperative programs, the state is required to assist local governments, soil and water conservation districts and individuals in restoring, protecting and improving water quality through grants provided from the Water Quality Improvement Fund.

Cooperative NPS pollution programs are combinations of programmatic tools, and technical and financial resources of varying emphases used to target water quality impairments in a given watershed and political jurisdiction. A cooperative approach to protecting water quality will help local stakeholders develop their capabilities individually and collectively to address local water quality impairments. The outcomes of cooperative NPS pollution programs will be a combination of existing efforts and new opportunities, which address specific water quality impairments and improvements, as supported by the public and the numerous stakeholders.

Cooperative NPS pollution programs also include educational strategies. Educational strategies are intended to enhance the understanding of NPS pollution and associated voluntary efforts, so that fewer regulatory approaches are needed. Local volunteer watershed or stakeholder organizations can provide additional assistance to complement DCR's existing services.

In addition to local needs, the cooperative NPS pollution programs will be targeted to address stream segments listed as impaired or not meeting water quality standards in accordance with the federal Clean Water Act requirements. DCR has taken many steps to focus its

NPS pollution programs on a watershed basis in order to take advantage of the efficiencies and effectiveness of a more comprehensive, integrated approach to NPS pollution abatement.

In addition to cooperative program development, the Water Quality Improvement Act requires that DCR, in

conjunction with other state agencies, evaluate and report, biennially, on the impacts of nonpoint source pollution on water quality and water quality improvement to the governor and the General Assembly. The evaluation shall, at a minimum, include considerations of water quality standards, fishing bans, shellfish contamination, aquatic life monitoring, sediment sampling, fish tissue sampling and human health standards. The report shall, at a minimum, include an assessment of the geographic regions where water quality is demonstrated to be impaired or degraded as the result of nonpoint source pollution and an evaluation of the basis or cause for such impairment or degradation.

Development of Watershed Roundtables

Roundtables will be formed for each river basin to provide watershed-based forums for stakeholders to participate in defining critical watershed needs, targeting problems for solutions, and providing input on potential management options to restore and protect water quality.

In particular watershed roundtables will:

- identify comprehensive watershed goals
- develop and support the implementation of management options and strategic actions
- assist in monitoring the success of the strategic actions
- conduct public outreach to help restore and protect water quality
- support the coordination of efforts conducted by federal, state and local agencies and interest

groups to restore and protect water quality

In the Southern Rivers Watershed (river basins located outside the Chesapeake Bay watershed), where the tributary strategies have not been developed, these roundtables will be instrumental in helping to assure effective basin planning.

Tributary Strategy Development and Implementation

Tributary plans prepared by state agencies under the direction and guidance of the office of the Secretary of Natural Resources and pursuant to *Code of Virginia* §2.1-51.12:1 shall include, among other requirements, the following:

- recommended specific strategies, goals, commitments and methods of implementation designed to achieve the nutrient and sediment goals;
- a report on progress made pursuant to the "Chesapeake Bay Basin-wide Toxics Reduction and Prevention Strategy" applicable to the tributary for which the plan is prepared;
- a report on progress on the "Submerged Aquatic Vegetation Restoration Goals" signed by the Chesapeake Executive Council on September 15, 1993, that is applicable to the tributary for which the plan is prepared;
- specifically identified recommended state, local and private responsibilities and actions, with associated timetables, for implementation of the plan; and,
- specifically identified sources of state funding and estimates, and a schedule of costs for the recommended alternatives in each plan.

Tributary strategies have been prepared, or are under development for the Shenandoah-Potomac, the Rappahannock, the York, and the James rivers, and the Eastern Shore. Water quality improvements target increased clarity and dissolved oxygen levels. These

improvements provide a basis for the reestablishment of habitat for underwater grasses, finfish, shellfish and other living resources.

In order to promote valid solutions to the problems identified for each individual basin, tributary strategies incorporate the most current and best available science, monitoring data and computer modeling. To further ensure solutions are realistic, involvement of local decision-makers, interested citizens and interest groups is actively sought. Implementation of tributary strategies is voluntary and eligible for cost-share funding under Virginia's Water Quality Improvement Act.

Staff from DCR, DEQ, the Chesapeake Bay Local Assistance Department (CBLAD) and other natural resource agencies are working with localities and local interests to assess local conditions including ongoing pollution reduction activities. These state and local teams are identifying existing nutrient loads, measuring reduction practices already in place, assessing how much nutrient reduction is practical in the particular region and identifying corrective measures.

Watershed Assessment

The purpose of the watershed assessment program is to provide a comparative evaluation of the state's waters on a watershed basis. This allows for targeted NPS pollution protection opportunities. There are 494 watershed units within 17 major basins.

The assessment ranks inventory data and water quality measures, producing an overall rank from these components.

Inventory data is related to specific land use, animal density and other NPS factors which have been developed in a uniform manner for all watersheds. Water quality measures, where available, are also used to identify watersheds with known water quality problems. This data is divided among agricultural, urban and forestry practices.

Results of the assessment are published in the Commonwealth's 305(b) report, and in a separate NPS Assessment Report.

The Nonpoint Source Watershed Assessment Report summarizes information from DCR, DEQ, Virginia Department of Forestry (DOF), Natural Resources Conservation Service (NRCS), Virginia Cooperative Extension (VCE), local soil and water conservation districts (SWCDs), local governments, and other existing outlets for information concerning nonpoint source impacts to Virginia waters.

Watershed Restoration Action Strategy Development

As previously described, federal guidance issued in 1998 requires states to develop Watershed Restoration Action Strategies (WRAS). In response, Virginia has developed a program that will incorporate a two-tiered

approach to development and implementation of Watershed Restoration Action Strategies. This two-tiered approach is consistent with Virginia's UWA prioritization process, which identifies both watershed-level and broader basin-level objectives for FY1999 - FY2000 period. This approach also takes advantage of existing basin planning efforts. With regard to development of WRAS to address the basin-level priorities established under the Shenandoah-Potomac and other Chesapeake Bay Tributary Strategies, Virginia is well ahead of the schedule and process envisioned in the Clean Water Action Plan. Virginia has completed, or is in the final stages of completing, tributary strategies which fulfill the role of Watershed Restoration Action Strategies, for all of Virginia's Chesapeake Bay tributaries.

Virginia has developed a detailed nutrient reduction strategy for the Shenandoah and Potomac river basins and has committed to implementing this strategy by the year 2000 to meet nutrient reduction goals established by the Chesapeake Bay Agreement. An unprecedented level of resources has been committed to meeting the nutrient reduction goals established in the strategy and substantial progress has been made toward strategy implementation. This restoration priority is reflected in the 1998 Unified Watershed Assessment and Restoration Priorities document. The Shenandoah and Potomac river basins are identified as a short-term Unified Watershed Assessment Restoration Priority. Although the Shenandoah and Potomac Tributary Strategy focuses on nutrient reduction, control actions

will also provide fecal coliform and sediment reduction benefits.

Development and implementation of tributary strategies for the Rappahannock, York, and James river basins strategies has also been identified as a watershed restoration priority in the 1998 Unified Watershed Assessment and Restoration Priorities document. Interim strategies have been completed for those tributaries and implementation is already underway. Final strategies for the lower bay tributaries will be completed in 1999, and will identify specific activities and objectives for implementation.

Basin-wide Watershed Restoration Action Strategies will be developed for Virginia's Southern Rivers through the Watershed Conservation Round Table process and the Water Quality Management Planning process to be developed in accordance with Section 303 (e) of the

Clean Water Act (CWA). A draft of the Tennessee - Big Sandy Basin has been completed and is currently under review. Work on strategies in other basins will begin as early as 1999. As with the Bay Tributary Strategy process, Watershed Restoration Action Strategy development and implementation in the Southern Rivers will involve extensive stakeholder and local government participation, and will require a substantial commitment of time and resources.

With regard to development of Watershed Restoration Action Strategies to address the smaller-scale, watershed-level priorities identified in the UWA, Virginia will use a combination of existing watershed implementation plans, and soon-to-be-developed TMDL implementation plans. These plans will be developed at the appropriate watershed scale to address watershed-level impairments or threats which contributed to the inclusion of eight-digit Hydrologic Unit Catalog (HUC) watersheds on Virginia's high-priority list for the 1998 UWA.

In many cases, significant NPS abatement activities have already been initiated in Virginia's high priority watersheds and project-level or watershed-level implementation plans have already been developed. For example, watershed projects funded by CWA Section 319 are required to have implementation plans, as

described in EPA's May, 1996 *NPS Program and Grants Guidance for FY1997 and Future Years*. We believe that these implementation plans constitute WRAS.

In other cases, Virginia anticipates the near-term development of TMDL implementation plans. Virginia has established a two-year schedule for development of TMDLs for several high-priority watersheds. In addition, Virginia's Water Quality Monitoring, Information, and Restoration Act requires implementation of TMDL plans once EPA has approved (finalized) them. Virginia will work with local governments, soil and water conservation districts, planning district commissions, and non-governmental organizations to develop implementation plans for each TMDL.

Virginia's UWA reflects both basin-level and smaller watershed-level priorities. A multi-level approach to WRAS development and implementation is needed to effectively address nonpoint source water quality and resource protection issues. In developing watershed

strategies, Virginia will seek opportunities to closely coordinate basin and watershed-level strategies by identifying and tracking implementation efforts that help meet watershed and basin-wide water quality goals.

Virginia's basin-wide WRAS and Chesapeake Bay Tributary Strategies, in combination with existing watershed implementation plans and proposed TMDL implementation plans, incorporate all elements of a Watershed Restoration Action Strategy. *The Shenandoah and Potomac River Basins Tributary Nutrient Reduction Strategy* addresses all of the elements specified in federal guidance issued in December of 1998. The strategy was developed in cooperation with federal, state, and local agencies, as well as watershed-based organizations and the public. While the target of the strategy is restoration of the Chesapeake Bay and the Potomac River estuary, the actions implemented through the strategy will have significant local water quality benefits as well.

303(d) Total Maximum Daily Load Priority List

Section 303(d) of the Clean Water Act and EPA's Water Quality Planning and Management regulations (40

CFR Part 103) require states to develop Total Maximum Daily Loads (TMDLs) for waterbodies that are not meeting designated uses under technology-based controls. The TMDL process establishes the allowable loadings of pollutants or other quantifiable parameters for a water body based on the relationship between pollution sources and in-stream water quality conditions. By following the TMDL process, states can establish water-quality based controls to reduce pollution from both point and nonpoint sources, and restore and maintain the quality of their water resources (USEPA 1991a).

Section 303 (e) Continuing Planning Process (CPP)

The Continuing Planning Process is a requirement of section 303(e) of the Clean Water Act and Section 130.5 of 40 CFR. It is a document which explains the state's process for implementing federal/ state laws and regulations on water quality. The CPP describes the process for developing and updating the content, uses or purpose, implementation requirements, agencies involved, and public participation requirements of the state's water quality management programs.

Following is a list of water quality programs addressed in the CPP:

- VPDES & VPA Permit Program
- Construction Assistance Grants Program
- 303(d) TMDL Priority List and TMDL Development
- 303(e) Water Quality Management Plans including Citizens Monitoring
- 305(b) Water Quality Report
- 319 NPS Program
- State's Water Quality Monitoring Plan

- CWAP and Watershed Restoration Action Strategies
- CZARA
- Mining Reclamation
- Chesapeake Bay Tributary Nutrient Reduction Strategies
- WQIA
- Water Quality Monitoring Information

and Restoration Act

Virginia's updated CPP will be submitted to EPA by November 1, 1999.

Natural Areas Management Program

DCR's Division of Natural Heritage initiated the Karst Groundwater Protection Program (1994) in order to document, preserve, and restore the groundwater habitats of sensitive species. The project is implemented by the Natural Areas Management Program and shared with the Nonpoint Source Management Program; an arrangement that highlights the integral connection between the preservation of natural heritage resources and the quality of the state's waters and drinking water supplies. Program staff focus on local and regional threats to water quality in the western Virginia karst region, and work in close cooperation with Soil & Water Conservation Districts, planning district commissions, the Source Water Assessment Program (Va Dept. of Health), the US Geological Survey, and the state's Natural Area Preserves System. Karst groundwater protection is promoted through a combination of technical assistance, data collection (monitoring, mapping, and tracer testing), and public outreach, which includes

brochures, materials, and educational efforts coordinated through Project Underground and Project WET. With regard to groundwater issues, the program facilitates coordination between the diverse group of agencies and institutions affecting nonpoint source management in each basin.

Analysis of Existing Programs

The programs described previously demonstrate that the commonwealth has the institutional framework in place to address nonpoint source pollution control on a watershed basis. However, there remain opportunities to improve program and agency coordination. In particular, the links between various basin-level planning initiatives and programs need to be clarified. Also, a mechanism is needed to enhance targeting and prioritization of watershed restoration efforts and there is a need to streamline reporting and assessment

programs. There may be opportunities to consider state and federal programs that address drinking water protection in determining watershed priorities.

There appears to be a 'disconnect' among the various statutes and program requirements related to basin level planning and management activities. For example, the cooperative river basin studies developed by the Natural Resources Conservation Service, the Continuous Planning Process required by Section 303(E) of the Clean Water Act and the Cooperative Watershed Initiative set forth in the Water Quality Improvement Act were established by separate federal and state statutes or regulations. Because these statutes fail to recognize each others' respective legislative requirements, there is a lack of coordination and recognition among these programs.

Similarly, there are various statutory and regulatory assessment and reporting requirements for each program. Specifically, Section 305(b) of the CWA requires a water quality assessment report, Section 319 of the CWA requires a NPS assessment report, Section 303(d) requires a priority list of impaired streams, and the WQIA requires a NPS assessment report. While there are some similarities between the reporting requirements for these programs, the schedules are often different. As a result, the reports often contain duplicate information or create conflicts for managing staff resources and program priorities.

Another watershed management related issue identified through the work group process is the need to better target and prioritize implementation efforts. In particular, the need to establish TMDL priorities was identified in several work groups. Issues were also raised regarding how to accomplish better watershed prioritization and the need for better technical data. Finally, the concern was expressed that the state should not focus all its attention on impaired streams. Rather, it was felt that Virginia needs to provide technical and financial assistance to avoid degradation of streams that currently meet water quality standards. This allows for the long-term maintenance and sustainability of water quality in the commonwealth.

The following objectives have been created for watershed prioritization. Strategies and actions necessary to accomplish these short-term goals will be listed in the tables that follow. (For additional strategies, objectives, and tasks regarding implementation of watershed management measures in the coastal zone refer to Chapter XIII Coastal Nonpoint Source Pollution Control Program.)

Objective 1. By 2004, establish well integrated and coordinated basin planning and management programs that minimize program overlap and leverage program resources to address contaminants that may pose risks to either the environment or public health

Objective 2. By 2005, establish well integrated and coordinated assessment and reporting programs that minimize program overlap and duplication

Objective 3. By 2003, the Department of Environmental Quality and the Department of Conservation and Recreation will develop the protocols and data needed to prioritize total maximum daily load TMDL development based on severity of impact


OBJECTIVES (SHORT-TERM GOALS)

TABLES OF OBJECTIVES & STRATEGIES

| OBJECTIVE 1 | | | | |
|--|---|--|--------------------|------------------------|
| <i>By 2004, establish well integrated and coordinated basin planning and management programs that minimize program overlap and leverage program resources to address contaminants that may pose risks to either the environment or public health</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 1.1 Form a subcommittee to the Nonpoint Source Advisory Committee (NPSAC) to identify areas of basin planning and management duplication and overlap and develop recommendations for agency heads | Identify all parties involved with basin level planning and management activities | •NPSAC agencies | 2003 | •General Fund |
| | Identify opportunities to improve coordination among tributary strategy development, Cooperative River Basin studies, Continuous Planning Process, and the Cooperative Watershed Initiative | | | |
| 1.2 Establish roundtables for major state river basins | Develop basin specific strategic action plans | •DCR •Local Govt. •SWCDs •NPSAC Agencies •others | 2001-2002 | •General Fund |

| OBJECTIVE 2 | | | | |
|--|---|-----------------------------|-------------|-----------------|
| <i>By 2005, establish well integrated and coordinated assessment and reporting programs that minimize program overlap and duplication</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 2.1 Use a subcommittee to the Nonpoint Source Advisory Committee to identify areas of duplication and overlap in reporting and assessment requirements, and opportunities to combine nonpoint source water quality assessment and reporting programs | Determine if legislative changes are needed to establish compatible reporting schedules | •DCR & other NPSAC Agencies | 2003 | •General Fund |
| 2.2 Subcommittee develops and submits to agency heads recommendations for streamlining assessment and reporting requirements | | •NPSAC Agencies | 2004 | •General Fund |

| OBJECTIVE 3 | | | | |
|--|---------------|-------------------|-------------|-----------------|
| <i>By 2003, the Department of Environmental Quality and the Department of Conservation and Recreation will develop the protocols and data needed to prioritize total maximum daily load TMDL development based on severity of impact</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| | | | | |

| | | | | |
|--|---|----------------------|---|----------------------|
| <p>3.1 DEQ and DCR will reactivate the total maximum daily load work group that will meet quarterly, or as often as necessary, to identify research needs and develop needed protocols, such as waters with shellfish or benthic impairments</p> | <p>Negotiate priorities and</p> | <p>•DEQ •DCR</p> | <p>Meet quarterly or as often as needed</p> | <p>•General Fund</p> |
| |  | | | |
| | <p>schedules with the Environmental Protection Agency</p> | | | |
| | <p>Provide a forum for public input into developing watershed priorities</p> | | | |
| | <p>Identify opportunities for using grant set-asides for research and protocol development (Section 604(B) and Section 319)</p> | | <p>2002</p> | |

WORK GROUP MEMBERS & AGENCY/ORGANIZATION REPRESENTED

Watershed Prioritization

Department of Conservation & Recreation Facilitator:

Mr. Karl Huber

Nonpoint Source Planning and Grants Program Manager:

Mr. Rick Hill

Mr. Mark Bennett

Department of Conservation & Recreation

Mr. Matt Bley
Department of Conservation & Recreation

Mr. Wade Biddix
Natural Resources Conservation Service

Mr. Allen Bishop
Department of Mines, Minerals & Energy

Mr. Michael Bowman
Department of Conservation & Recreation

Ms. Diane Dunaway
Alliance for the Chesapeake Bay

Mr. Jay Gilliam
Izaak Walton League-Save Our Streams

Dr. Robert Hale
Virginia Institute of Marine Science

Mr. Paul Howe
Virginia Forestry Association

Mr. Karl Huber
Department of Conservation & Recreation

Ms. Ann Jennings
Chesapeake Bay Foundation

Mr. Victor Liu
Crater Planning District Commission

Mr. Charles Martin
Department of Environmental Quality

Ms. Pam Mason
Virginia Institute of Marine Science

Ms. Diane McCarthy
Department of Conservation & Recreation

Mr. Shep Moon
Chesapeake Bay Local Assistance Department

Mr. Duke Price
Virginia Department of Health

Mr. Jared Sims
Department of Game & Inland Fisheries

Ms. Randy Slovic
Sierra Club

Mr. Ward Staubitz
U.S. Geological Survey

Mr. Wilmer Stoneman
Virginia Farm Bureau

Ms. Catherine Tucker
Virginia Council of Trout Unlimited

Mr. Hugo Valverde
Hampton Roads Planning District Commission

AGRICULTURE



LONG-TERM GOALS (15- YEAR)

Goal 1 - Confined Animal Feeding Operations

Maintain existing beneficial uses in unimpaired state waters and restore beneficial uses in surface waters where confined animal feeding operations are contributing to a water quality impairment caused by sediment, nutrients or pathogens as listed in the 303d TMDL Priority List Report, or where ground water contaminants originating from confined animal feeding operations exceed the state ground water standard, by 2014

Goal 2 - Livestock Grazing

Maintain existing beneficial uses in unimpaired state waters and restore beneficial uses in surface waters where livestock grazing operations are contributing to a water quality impairment caused by sediment, nutrients or pathogens as listed in the 303d TMDL Priority List Report, or where ground water contaminants originating from livestock grazing operations exceed the state ground water standard, by 2014

Goal 3 - Cropland Management (includes field crops, vegetables, orchards and vineyards)

Agricultural cropland will be managed in ways which maintain or restore beneficial uses in surface waters and protect water quality in ground water by controlling losses of sediment to surface waters and losses of nutrients and toxics to ground and surface waters by 2014

Goal 4 -Nursery and Ornamentals Management

Commercial nursery and ornamental operations will be managed in ways which maintain or restore beneficial uses in surface waters and protect water quality in ground water by controlling losses of sediment to surface waters and losses of nutrients and toxics to ground and surface waters by 2014

Goal 5 - Agricultural NPS Program Development

Continue to develop and implement agricultural nonpoint source (NPS) pollution programs to effectively prevent and reduce pollution in ground and surface waters through 2014

INTRODUCTION

Agriculture is a large and diverse industry in Virginia. It accounts for approximately nine million acres (30 per cent) of Virginia's land use. Agricultural land uses include row crop production of grains, forage, peanuts, cotton, tobacco, and vegetables; pasture and hay production necessary for beef and dairy production; as well as facilities for poultry, swine, beef, dairy, and equine operations; orchards; and ornamental nursery operations.

According to the 1998 303(d) *Total Maximum Daily Load Priority List Report*, agricultural nonpoint source pollution is the largest source of pollutants causing non-attainment of designated water uses in monitored segments of Virginia's rivers. The *Virginia Nonpoint Source Pollution Watershed Assessment Report* indicates that the pollution potential is greatest where agricultural activities occur on highly erodible soils, in areas of intensive crop and pasture production and in areas of high livestock and poultry production. Nonpoint source pollutants typically associated with agriculture include nutrients, sediment, pathogens and toxics. These pollutants can escape crop field and livestock production areas and enter surface and ground water systems. This can occur as a result of surface runoff and air deposition. When their levels in water become significant, they can have a negative impact on aquatic life, cause a reduction in dissolved oxygen, clog water treatment system filters and weaken or destroy aquatic vertebrates and invertebrates as well as their habitat. Human use of the water may become affected as a result of excessive plant growth, increased turbidity, and damaged fisheries and wildlife habitat. Nonpoint source pollution associated with agricultural activities can also impact the water quality of ground water supplies, particularly in areas with highly permeable soils or karst topography.

AGENCY ROLES & RESPONSIBILITIES

Department of Conservation and Recreation

The Department of Conservation and Recreation (DCR) coordinates the various statewide agricultural nonpoint source pollution management programs and has been designated as the lead management agency for the development and implementation of Virginia's Nonpoint Source Pollution Management Program. The department will be responsible for the direction and program coordination and for reporting to EPA. In addition to these leadership activities, DCR agricultural programs focus on several areas. The Agricultural Best Management Practices (BMPs) Cost-Share Program is designed to encourage implementation of various agricultural BMPs statewide through cost-sharing of both structural practices and annual practices capable of reducing the loss of sediment, nutrients, toxics, and pathogens to ground and surface waters. DCR also implements the BMP Tax Credit Program and the Precision Nutrient and Pesticide Application Equipment Tax Credit under the guidance of the Virginia Soil and Water Conservation Board. DCR operates the Nutrient Management Program which encourages the proper land application and efficient use of fertilizers, manures, sewage sludges and other nutrient sources in ways which protect water quality. DCR-approved nutrient management plans are a required component of animal waste permits for dairy, swine, beef farms with 300 or more animal units, and for poultry farms with 200 or more animal units. Biosolids use permits are reviewed by nutrient management field staff to identify and manage site-specific nutrient issues. A nutrient management training and certification program is available to encourage private sector participation. The department also manages the nonpoint source pollution component of the Water Quality Improvement Fund, which is utilized for program implementation and to develop a variety of NPS projects.

In addition, as the demand and reliance on groundwater resources increase in agricultural areas undergoing unprecedented residential growth, DCR is cooperating with other agencies to establish a karst groundwater monitoring network in the vicinity of unstudied nonpoint sources, such as land application sites and rural subdivisions.

Department of Environmental Quality

Pursuant to the State Water Control Law, the Department of Environmental Quality (DEQ) is the lead

state water quality agency. DEQ issues permits for numerous agricultural activities in order to control NPS pollution. Virginia Pollution Abatement (VPA) permits are issued for animal feeding operations with 300 or more animal units. Fish farms and hatcheries that have point source discharges to surface waters more than 30 days per year are regulated under a general Virginia Pollutant Discharge Elimination System (VPDES) permit. The main focus of this VPDES permit is control of solids in the wastewater. DEQ also issues permits for ground water withdrawals greater than 300,000 gallons per month, including agricultural withdrawals, in designated ground water withdrawal management areas.

Department of Agriculture and Consumer Services

The Virginia Department of Agriculture and Consumer Services administers several programs that have an impact on non-point source pollution control and management. One such area of major responsibility is the regulation of pesticide use, storage and disposal. By monitoring the application of pesticides on a random basis, conducting routine inspections of pesticide storage facilities and conducting an annual pesticide collection program to provide growers with a means to safely dispose of unwanted, outdated and banned pesticides, VDACS strives to insure that pesticides are handled safely and that the opportunity for environmental damage by pesticides is significantly reduced. In addition, VDACS conducts a plastic pesticide container recycling program, insures that applicators of Restricted Use Pesticides (RUPs) are properly certified, and that all pesticides are used and handled according to label directions; and works with the U.S. Department of Agriculture to insure that growers maintain adequate records of their RUP applications. In the program area dealing with site-specific water quality concerns, the Commissioner of Agriculture and Consumer Services administers the requirements of the Agricultural Stewardship Act.

Chesapeake Bay Local Assistance Department

The Chesapeake Bay Local Assistance Department (CBLAD) is responsible for the Virginia Chesapeake Bay Preservation Act (CBPA – §10.1-2100 et seq., *Code of Virginia*) and for administering Chesapeake Bay Preservation Area Designation and Management

Regulations (9 VAC 10-20-10) promulgated thereunder. CBLAD provides technical assistance, financial assistance, regulatory interpretations and programmatic guidance to local government officials, landowners, cooperating agencies, and all other interested parties regarding the agricultural criteria of the CBPA regulations and local ordinances. Site-specific resource management evaluations are conducted on agricultural parcels located within locally designated Chesapeake Bay Preservation Areas. These evaluations include fields that adjoin surface waters in 29 eastern Virginia counties and several cities.

Virginia Department of Health

The Virginia Department of Health (VDH) oversees the implementation of the Biosolids Use Regulations (12 VAC 5-585) promulgated by the State Board of Health. The regulations and adopted standards govern the land application, distribution or marketing of biosolids. Approximately one-half million wet tons of biosolids are applied to nearly 25,000 acres annually at specified agronomic rates. Roughly one-half of the applied biosolids originate from sources outside of Virginia. When a treatment works owner assigns responsibility for off-site biosolids use operations to a private contractor, a VDH permit is issued to that contractor.

Virginia Department of Forestry

The Department of Forestry (DOF) has served as lead in the governor's effort to develop the *Commonwealth of Virginia Riparian Buffer Implementation Plan*. DOF provides staff support to the Virginia Riparian Buffer Work Group, which is charged with implementing the plan. The multi-agency Riparian Buffer Work Group, appointed by the Secretary of Natural Resources, is responsible for implementation of set strategies to achieve the plan's objectives. The plan outlines six objectives and subsequent strategies to support the Virginia commitment to restore 610 miles of riparian forested buffers within the Chesapeake Bay watershed. In addition, at least 300 additional miles of restoration are sought in the Southern Rivers watersheds of the state. The objectives of the Riparian Buffer Implementation Plan are to:

- restore missing or inadequate buffers;

- conserve existing riparian buffers;
- enhance program coordination and accountability;
- enhance incentives; promote education and outreach; and,
- target, track and conduct research.

USDA-Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) provides both technical and financial assistance to producers to plan and implement conservation practices to address nonpoint source pollution and to improve water quality. NRCS maintains a network of field offices and regional technical assistance centers across the state to provide staff resources to work with local soil and water conservation districts, administer USDA programs and provide direct one-on-one assistance to producers. The NRCS framework of assistance is based on providing a conservation plan to address the resource needs and problems as well as the producers objectives. Additional technical assistance is then provided to implement and install the conservation practices planned. Financial assistance is often available under several programs (federal and state) to provide financial incentives to the producers.

NRCS also provides technical assistance to a variety of users in other natural resources related issues such as soil survey, Small Watershed Protection projects under Public Law 534 and Public Law 566 legislation, Emergency Watershed Protection in times of disaster, and the Resource Conservation and Development Program to assist sponsoring local units of government with resource based assistance.

USDA - Farm Service Agency

The Farm Service Agency (FSA) administers Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), Emergency Conservation Program (ECP) and with NRCS, Environmental Quality Incentives Program (EQIP). With these programs FSA assists producers with implementing conservation practices to address NPS

pollution and to improve water quality. FSA maintains a network of county offices (currently being co-located with other USDA programs) and provide one-on-one assistance to producers. Cost-share assistance is offered with EQIP (5 year contracts) and CRP (10-15 year contracts) to encourage the implementation of various agricultural practices that will reduce NPS pollution from nutrients, pesticides, sediment and will enhance wildlife. Some technical assistance is provided by FSA, but the majority is provided by NRCS. Other state and local agencies also provide financial assistance incentives to producers to implement these needed conservation practices. FSA and the state are working on a Conservation Reserve Enhancement Program which is slated to begin in 1999, and the conservation practices will address non-point source pollution and water quality in targeted areas in both the Southern Rivers watershed and Chesapeake Bay drainage.

FSA also administers the Emergency Conservation Program which provides cost-share assistance to eligible agricultural producers to rehabilitate farmlands and conservation facilities due to a natural disaster or severe drought.

Soil and Water Conservation Districts

Virginia's 46 soil and water conservation districts (SWCDs) are close partners with DCR in providing NPS pollution programs to their localities and have also begun to tackle difficult groundwater and planning issues in their areas. For example, many SWCDs in western Virginia have cooperated directly in karst resource protection projects with DCR's Natural Heritage Program, the Tennessee Valley Authority, and the US Fish & Wildlife Service. The SWCDs, who are self-governed political subdivisions of the state, help coordinate the many local, state and federal nonpoint initiatives designed to protect and enhance water quality. They are run by a locally elected board who sets priorities, and guides and directs the work of district personnel. Advisory, not regulatory in nature, districts provide assistance to local landowners in implementing Virginia's agricultural Best Management Practices on their land. They administer Virginia's Cost Share Program for the installation of BMPs, working with landowners to ensure that these practices are correctly installed and maintained, and follow up with "spot

checks" to see that the practices function properly.

In the tidewater region of the Chesapeake Bay watershed, the agricultural provisions of the Chesapeake Bay Preservation Act are administered as a cooperative effort between the SWCD and CBLAD, who provide personnel funding, training, and program guidance to the local soil and water conservation district. Districts also work closely with VDACS, becoming involved when an Agricultural Stewardship Complaint is lodged against a local agricultural operation. The district may choose to be involved in the investigation of the complaint or may opt to let VDACS handle this independently. However, if a complaint is considered valid, the SWCD will become involved to help the violator solve the water quality problems by providing whatever technical assistance is needed to install BMPs. The violator must ultimately have a Conservation Plan, which addresses the water quality problems, approved by the SWCD board.

Using a watershed approach, the districts in the bay region have been helping coordinate planning nutrient management reductions in the various tributaries that enter the bay. Many SWCDs have received EPA 319 grants to enable them to carry out some of this work as well as Virginia General Assembly funds, administered by DCR, which they have used in partnership with other SWCDs who share common watershed boundaries. These funds have produced joint projects with demonstrable reductions in nutrients, and mark the first time that districts have worked across their own political boundaries. Educational programs presented by districts have reached a great number of citizens, who otherwise would not make any connection between their activities and the resulting water quality impacts. These programs have involved many partners, including DCR, DEQ, VDACS, CBLAD, NRCS and the Cave Conservancy of Virginia (CCV).

Virginia Cooperative Extension Service

Virginia Cooperative Extension (VCE) is the outreach arm of Virginia's two land grant universities – Virginia Polytechnic Institute and State University (VPI&SU) and Virginia State University. Through local and area extension agents and with the support of university extension specialists, VCE provides educational programs and assistance to landowners, land managers,

and farmers. VCE provides a major educational role in Virginia's water quality efforts dealing with agriculture. Agents and specialists work with farmers to implement BMP's that are economically viable with the farming operation. Through outreach educational efforts in the form of field days, workshops, tours, seminars, one-on-one and other outreach methods, Extension agents coordinate educational outreach efforts with other state and federal partners who are involved in the NPS pollution control effort.

Through extension specialists, VCE can also respond to nonpoint questions or concerns with applied research that is applicable to farming operations in all parts of Virginia. Once the on-farm research is complete, conservation partners can then incorporate the information collected into nonpoint programs that are applicable and that are based on sound scientific information that has been provided through the efforts of VCE.

Finally, VCE is unique in that its programs are linked to local, state and the federal government. Because of VCE linkages to all three government entities, it is able to muster resources from any of the three, and to use these resources to help implement relevant nonpoint programs in coordination and in cooperation with other state and federal agencies.

Virginia Polytechnic Institute and State University

As one of the two land grant universities in Virginia, the Virginia Polytechnic Institute and State University (VPI&SU) mission focuses on teaching, research and extension/public outreach. Through its College of Agriculture, the university focuses its efforts on a comprehensive educational program for undergraduates and graduates who will be prepared to work on current issues affecting the Commonwealth of Virginia. With NPS pollution being a major initiative nationwide, the graduates of the College of Agriculture who focus their fields of studies on nonpoint source pollution issues are well qualified to join the work force in this expanding field of work.

The university also is one of the leading research institutions in the country. The departments of Crop, Soils, and Environmental Sciences, Biological Systems Engineering, Dairy Science, Animal and Poultry

Science, Entomology and others have comprehensive research programs that focus on current NPS pollution issues of the day. Manure management, waste management, nutrient management and integrated pest management (IPM) are just a few of the issues that these departments are currently conducting research in.

It is through VCE that the implementation of the research comes into play. VCE, through its presence in almost all localities in Virginia, is able to work in concert with state and local government to implement educational programs based on this sound scientific research. In sum, through its teaching, research and extension programs, VPI&SU is able to partner with other state and federal agencies on a multitude of NPS pollution initiatives.

Virginia State University

Virginia State University (VSU) is the other land grant universities in Virginia. Its mission is to promote and sustain academic programs that integrate instruction, research, and extension/public service in a design cost responsive to the needs and endeavors of individuals and groups within its scope of influence. The University provides bachelors degrees in many areas and master's degrees in selected areas. Its overall goals are:

- to foster intellectual and personal development of students;
- to provide a well-rounded liberal arts education;
- to develop in students the mastery of fundamental knowledge in various academic areas of their choice; and,
- to prepare students for furthering their studies at the graduate level by providing them knowledge skills, and abilities.

The university has a strong agricultural research program in the areas of nutrient management, pesticides, horticulture, crops, meat-goat, and aquaculture. Except for aquaculture research, which is operated by the university's Virginia Cooperative Extension scientists, the rest of the program is managed by the Agricultural Research Services (ARS), an independent department within the School of Agriculture,

Science and Technology. It functions under a separate director and operates closely with Extension to distribute research results to stakeholders throughout the commonwealth. Research in the environmental field includes land application of confined animal manure, with special emphasis on nitrogen and phosphorus mobility, atrazine sorption and fate in agricultural soils and tidal river sediments; wetlands and riparian buffer establishment; and development of BMPs for nutrients, pesticides and land application of confined animal manure.

CONSERVATION PARTNERSHIPS AND NON- GOVERNMENTAL ORGANIZATIONS

Non-governmental organizations such as the Virginia Dairymen's Association, the Chesapeake Bay Foundation, the Virginia Poultry Federation, the Virginia Agribusiness Council, and the Virginia Farm Bureau Federation have periodically volunteered to promote agricultural NPS practices and efforts in newsletters and other mailings, at farmer meetings, on radio programs and other outreach efforts. Other active participants include the Virginia Crop Production Association which routinely includes nutrient management and pesticide management concepts in educational meetings, and the various farm equipment dealers who have distributed information to producers on tax credit incentives for improved nutrient and pesticide application equipment. Agricultural chemical manufacturers encourage the sale of pesticides in returnable closed delivery systems by offering incentives to purchase equipment needed to utilize the closed system. Various activities of nongovernmental organizations, which support NPS pollution reduction such as those described previously, are expected to continue into the future.

ISSUE IDENTIFICATION &

PROGRAM ASSESSMENT

Nutrients

Major sources of nutrients used in agriculture include commercial fertilizers, manures, sewage sludges, industrial wastes, and legume atmospheric fixation. Nutrients such as nitrogen and phosphorus are necessary for sustainable agricultural production systems. When lost to the environment, nutrients are of concern in both ground and surface waters. In ground water, the primary nutrient of concern is the nitrate form of nitrogen. Excessive nutrients in groundwater that provides base flow to a surface water body may reduce the overall assimilative capacity of the stream. High nitrate levels in drinking water may cause adverse health effects in human infants and in certain livestock. Ground water is also a major contributor to surface water flow and can thereby contribute nitrate to surface waters. Due to the negative charge of the nitrate ion and its relatively high solubility in water, this form can leach rapidly through certain soils. This leaching is most problematic in permeable sandy soils of the coastal plain and karst topographic areas of the ridge and valley regions where shallow soils exist over fractured bedrock. These areas of the state have experienced instances of ground water nitrate-nitrogen levels above the EPA drinking water standard of 10 ppm as documented in several well testing studies. In surface waters, both nitrogen and phosphorus can negatively impact water quality by stimulating algal growth. This can lead to low levels of dissolved oxygen, thereby stressing aquatic organisms. Another impact of excessive algal growth is increased water treatment costs at intake points. Additionally, high levels of nutrients in the Chesapeake Bay have caused a reduction in the acreage of submerged aquatic grass beds due to phytoplankton stimulation and subsequent reduction in light transmitted to these shallow water plants. In fresh water aquatic systems, the concentration of phosphorus is frequently limited relative to nitrogen and thus phosphorus controls the degree of algae growth. In marine environments either nutrient may limit algae growth depending on the season.

Sediment

Agricultural land uses which may generate sediment losses to surface waters include cropland, pasture land, feedlots and farm roads. Sediments are primarily an issue in surface waters, but can seriously impact groundwater quality in karst areas. Fine textured clay particles can decrease light transmission to beneficial submerged aquatic vegetation in marine environments and can contain significant amounts of adhered nutrients. Coarse particulates do not contain attached nutrients but may cause sediment deposition problems in streams and lakes. Clay particles can remain suspended in water for long periods and may move considerable distance before deposition occurs. All areas of the state can be impacted by sediment loss, although erosion rates do vary considerably by soil texture and topography. Sustained soil erosion from agricultural fields can also reduce long term crop productivity potential.

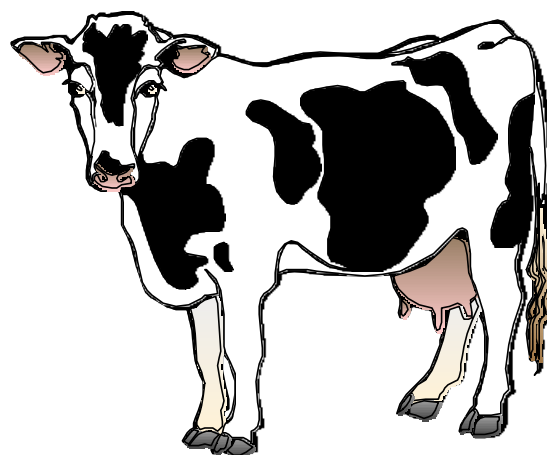
Toxics

Toxics involved in agricultural production systems include pesticide (insecticides, fungicides, herbicides), storage, and disposal; land application of sewage sludge which can contain heavy metals; and land application of industrial sludges. The sludge toxics are not caused by agricultural activities, but rather are a result of society's use of agricultural systems to beneficially utilize or dispose of these outputs. Highly water soluble toxics can be leached to ground water or be carried to surface waters in rainwater or irrigation runoff. Other toxic compounds that are relatively water insoluble can be carried to surface waters with eroded sediment, often attached to clay particles. Pesticide degradation rates in soils impact the loss potential. Wide scale contamination of ground or surface waters by any of the various toxics associated with agriculture is not believed to be evident in Virginia, however, proposed groundwater monitoring efforts in the Shenandoah River watershed may further clarify the risks associated with toxics issues. Misuse or mismanagement of land-applied toxics could create very localized water quality concerns.

Pathogens

Pathogens are disease causing organisms such as bacteria, viruses and protozoa. Potential agricultural

sources of these microorganisms include storage and land application of livestock wastes, livestock stream access points, storage and land application of municipal sewage sludge, and disposal of animal mortalities. Pathogens in water can cause illness in humans and other animals through consumption or contact. Contamination of ground water supplies is relatively unlikely except in areas with extremely permeable soils or areas with very prominent karst topography. Surface water contamination is more likely. Waste treatment processes generally reduce the levels of pathogens in waste. Following land application, exposure to environmental factors such as desiccation, ultraviolet light or contact time with soil microbes will reduce the potential for runoff of pathogens.



SOURCE CATEGORIES

Significant agricultural production sectors in Virginia and the potential pollutants most relevant to each is summarized in the following matrix table:

| SOURCE SECTOR CATEGORY | POLLUTANT CATEGORY | | | |
|------------------------------------|--------------------|-----------|--------|-----------|
| | SEDIMENT | NUTRIENTS | TOXICS | PATHOGENS |
| Confined Animal Feeding Operations | T | T | | T |
| Livestock Grazing | T | T | | T |
| Field Crops | T | T | T | |
| Vegetables | T | T | T | |
| Orchards and Vineyards | | | T | |
| Nurseries and Ornamentals | T | T | T | |

Confined Animal Feeding Operations

Confined animal feeding operations (CAFO) include farms raising dairy cattle, beef cattle, hogs and poultry held in unvegetated lots or indoor production facilities for the equivalent of 45 days per year or more. This definition pertains to both operations that require a permit and non-permitted operations. According to the 1997 Census of Agriculture, Virginia has 121,823 milk

cows on 1,671 farms, with 110 of these farms having 300 or more animal units and a total of 32,440 cows (26.6 per cent of total state milk cow numbers). The state has 1,639,058 beef cattle and calves located on 26,547 farms, however, confined feedlots likely only house about 2 per cent of these cattle. Hogs and pigs are raised on 1,170 farms with total inventory of 385,755 animals, with greater than 90 per cent of total statewide animals being produced on 79 farms. Virginia has 2,744 poultry farms which produce primarily chickens,

turkeys or eggs. Sediment runoff can result from unpaved confinement lots and other temporary holding areas on confined dairy and beef farms. Nutrients may be lost to ground or surface waters due to improperly stored or land-applied manure. Pathogen impacts to waters may occur due to direct runoff of animal wastes.

Livestock Grazing

Livestock grazing operations include beef cattle, dairy cattle, horse, sheep and other farms. The state has 1,639,058 beef cattle and calves located on 26,547 farms, almost all of which are grazing operations. Virginia also produces 117,714 sheep and lambs on 1,727 farms. Horses number 43,977 on 7,083 farms. Sediment loss can occur from poorly managed and overgrazed pastures; travel lanes; grazed stream banks; and any feeding, watering, or shady location where the animals may periodically congregate. Nutrient loss is primarily related to uneven distribution of deposited animal feces and urine in pastures, direct manure runoff potential in overgrazed pastures or direct deposition in surface waters at stream access points. Pathogens, primarily coliforms, may be contributed to surface waters due to direct manure runoff potential in overgrazed pastures, or direct deposition in surface waters at stream access points.

Field Crops

Field crops include corn, soybeans, small grains, cotton, peanuts, tobacco, sorghum, hay, and similar crops. A total of 2,532,000 acres of these crops were planted in Virginia in 1997. Gully, rill and sheet erosion are the primary sediment contributors. Much of the potential for sediment contribution to surface waters is from fields classified as "highly erodible land." Nutrients may be lost to ground or surface waters due to over application or improper timing of fertilizer, manure or sludge applications. Potential toxic sources include herbicides, insecticides and fungicides.

Vegetables

Vegetable operations produce primarily tomatoes, snap beans, cabbage, sweet corn, cucumbers and bell peppers on approximately 21,700 acres. Sediment,

nutrient, and toxic loss potential per acre from production fields is likely higher than for field crops due to a greater reliance on clean tillage, use of plastic mulch, greater use of irrigation, high market value as compared to fertilizer costs, and greater use of crop protection materials.

Orchards and Vineyards

Orchards and vineyards comprise 30,552 and 1,827 acres respectively in the state. Sediment and nutrient loss potential is believed to be limited due to a long cropping period after establishment, limited soil tillage area and relatively low nutrient application rates. Toxics used in production are primarily insecticides and fungicides.

Nurseries and Ornamentals

Nurseries and ornamentals include field-grown nursery stock, container nurseries, greenhouses and sod production. Approximately 1,019 such farm operations exist in Virginia. These operations have potential to contribute sediment from bare ground and from irrigation or rainwater runoff. Container nurseries and greenhouses may contribute nutrients to ground or surface waters due to a high plant value-to-fertilizer expense ratio; significant irrigation applications, which sometimes contain injected fertilizers; the use of plastic mulches or site modification techniques to encourage infiltration of excess water such as gravel or filter cloth ground covers.

Assessment of Nonpoint Source Pollution Programs

Agricultural BMP Cost-Share Program - DCR, SWCDs

This program provides financial incentives statewide to agricultural landowners and operators for the implementation of approved BMPs, which improve water quality, on crop and pasture lands and animal feeding operations which improve water quality. Eligible practices include animal waste storage structures, cereal grain cover crops, animal mortality composters

and a number of others. The program allows for a maximum cost-share rate of 75 per cent of specific practices and a payment limit of \$50,000 annually per participant. The producer must have a conservation plan prior to approval of cost-share funds, and nutrient management plans are required for certain practices. This program is administered at the local level by soil and water conservation districts.

Agricultural BMP Tax Credit Program - DCR, SWCDs
(§58.1-339.2 and §58.1-439.4 *Code of Virginia*)

This incentive program provides for a 25 per cent state income tax credit up to \$17,500 annually to encourage farmers to install eligible BMPs. To qualify, the BMP must be listed in and comply with the specifications contained in the Virginia Agricultural BMP Manual. In addition, the practice installation must be approved by the local soil and water conservation district.

Agricultural Stewardship Act - VDACS, SWCDs (§10.1-559.1 et. seq. *Code of Virginia*)

This regulatory program allows for enforcement of a number of agricultural BMPs. The Commissioner of Agriculture and Consumer Services will accept any complaint alleging water pollution from an agricultural activity. Within the jurisdiction of the Agricultural Stewardship Act, complaints of this nature are investigated to determine if the agricultural activity is causing or will cause pollution. If the pollution is a threat to Virginia's environment, the Commissioner will require that preventive measures be taken. VDACS, in cooperation with local SWCDs, administers this program, assisted by DCR, DEQ and VCE.

Animal Disease Control and Prevention - VDACS

This regulatory program administers specific animal disease control programs, usually as a cooperative effort with the USDA. Certain diseases, such as tuberculosis, can be transmitted from one species of animal to another and from animals to humans. Some of these "inter-species" pathogens are water- or fluid-borne, while others are airborne. Professional and technical assistance is provided to livestock owners regarding measures to control these diseases.

Vaccination of animals for specific diseases, such as brucellosis, are promoted to prevent disease. However, once disease has been disclosed, VDACS initiates action to separate infected animals and supervises the cleaning and disinfection of the areas and facilities in which the diseased animals have been in contact.

Biosolids Use Regulations - VDH (§32.1-164.5 *Code of Virginia*, 12 VAC 5-585-10 et. seq.)

These regulations and adopted standards govern the land application, distribution or marketing of biosolids. When a treatment works owner assigns responsibility for off-site biosolids use operations to a private contractor, a VDH permit is issued to that contractor. As defined by the Virginia Regulations, biosolids means a sewage sludge that has received an established treatment for a required level of pathogen control, has been treated or managed to reduce vector attraction to a specified level and contains acceptable levels of pollutants in accordance with an issued permit. The health department works with a Biosolids Use Regulation advisory committee composed of cooperating agency personnel, land grant university staff, application contractors, treatment plant owners and other interested parties to assist in refining the regulations and guidance documents. The regulations and permits issued control the rate of application based on nutrient content of the biosolids. Permits also contain site-specific management practices to reduce the risk of nutrient and pathogen loss from application sites.

Chesapeake Bay Preservation Act - CBLAD, SWCDs - (§10.1-2100 et. seq. *Code of Virginia*, 9 VAC 10-20-10 et. seq.)

This regulatory program requires landowners in 29 eastern Virginia counties and several cities to maintain 100 foot wide permanently vegetated buffers. These buffers may be modified to 25 feet or 50 feet if the combination of the reduced buffer and the BMPs that are implemented on the adjoining fields are deemed to achieve water quality protection, pollutant removal and water resource conservation at least the equivalent of the 100 foot buffer area. These buffers are to be established where they do not exist, and maintained to protect water quality by filtering NPS pollution runoff from agricultural operations. Agricultural lands that are

adjacent to or within Resource Protections Areas (the water resource plus the 100 foot wide buffer) are given a higher priority for undergoing a site specific resource evaluation. Those evaluations are performed by soil and water conservation district staff funded by CBLAD and are performed on a field-by-field basis. Evaluations include: verification of the existence of any required vegetated buffer; an evaluation of the potential for erosion and an analysis of the nutrient loadings and methods that are applied to the land. Staff, in coordination with NRCS and DCR, then recommends the implementation of necessary or appropriate erosion control, nutrient management or pest management BMPs to farm operators and landowners to reduce soil loss and protect water quality.

Conservation Reserve Program (CRP) - NRCS

This is a voluntary program that offers annual rental payments, incentive payments for certain activities and cost-share assistance to establish approved conservation cover on eligible cropland. The program encourages farmers to plant long-term resource conserving cover to improve soil, water and wildlife resources. Contract periods are from 10 to 15 years.

Environmental Quality Incentives Program (EQIP) - NRCS

This program was established in the 1996 Farm Bill, the Federal Agriculture Improvement and Reform Act of 1996 (PL104-127). It is a voluntary program that provides technical, financial and educational assistance primarily in designated priority areas. Half of the assistance is to be targeted to livestock related natural resource concerns and the remainder to other significant conservation priorities. Priority areas are selected by NRCS for specific areas within the state based on recommendations from the State Technical Committee. All EQIP activities must be carried out according to a Conservation Plan. Conservation Plans are developed by the producer in cooperation with NRCS or other service plans that are site-specific and identify the primary natural resource concerns and the treatment agreed to by the farmer. All practices applied must meet NRCS Field Office Technical Guide standards. EQIP funding is offered to producers

through 5 to 10 year contracts based on the producer's Conservation Plan. When producers apply for a contract the NRCS conducts an evaluation of the cost and the expected environmental benefits. Contracts are awarded on the greatest expected benefits for the least expenditure. A producer may elect to receive less than the total amount in order to improve the chances of being accepted. Conservation practices can be cost shared up to 75 per cent of the total cost of installing the practice.

Farm*A*Syst -VCE

Virginia Cooperative Extension, with NRCS, coordinates the Farm*A*Syst program. A number of state and federal agency field staff have been trained on how to implement this program. Farm*A*Syst is an intensive one-to-one educational program that focuses on an on-farm assessment of potential environmental hazards on the farmstead. Once the hazards are identified, corrections to these hazards can be made by the farm family as warranted. Because of the intensive nature of the program, just a few farms have gone through the Farm*A*Syst assessment at this time.

Food Security Act / Conservation Compliance - NRCS, FSA

In order to remain eligible for USDA program benefits, farmers must stay in compliance with an NRCS approved Food Security Act Conservation Plan. Program benefits include federally subsidized crop insurance, price support payments, and disaster assistance.

Ground water Withdrawal Regulations - DEQ (§62.1-261 et. seq. *Code of Virginia*, 9 VAC 25-600 et. seq., 9VAC25-620 et. seq.)

Ground water withdrawal permits are required for any entity withdrawing 300,000 gallons or more during any month, including agricultural withdrawals, in designated state ground water management areas. While these regulations do not specifically address NPS concerns, water conservation and management plans are required when ground water withdrawal permits are issued for new or expanding uses. Plans must include

requirements for the use of water saving plumbing and processes, an evaluation of water reuse options, a water education program, a water loss reduction program, and mandatory reductions during water shortage emergencies. These requirements will be placed on existing withdrawals at the end of the current 10-year permit term. Two ground water withdrawal management areas have been designated which include the cities of Chesapeake, Franklin, Hopewell, Norfolk, Portsmouth, Suffolk, Virginia Beach, Hampton, Newport News, Poquoson, Williamsburg, and the counties of Accomack, Isle of Wight, Northampton, Prince George, Southampton, Surry, Sussex, Charles City, James City, King William, New Kent, York, and the portions east of Interstate 95 in Chesterfield, Hanover and Henrico counties. Surface water management areas are under consideration but would only place limits on withdrawals during periods of drought.

Integrated Pest Management (IPM) Implementation - VCE

Virginia Cooperative Extension has an extensive Integrated Pest Management (IPM) program implemented in Virginia. Education based on sound research is the cornerstone of a successful IPM program. Through ongoing research on pest economic thresholds in the many crops in the state, VCE is able to provide the latest technical information to farmers that allows them to make educated decisions regarding the pest control methods on their land. In a recent survey of farmers in Virginia it was determined that more than 80 per cent of the farmers surveyed are incorporating IPM tools in their pest management strategies.

Irrigation Water Management -VCE

Virginia Cooperative Extension coordinates a state-wide irrigation educational program for agricultural irrigators throughout the commonwealth. BMPs for irrigators are an important component of this educational program. Over the next two years, VCE will lead an educational effort through a series of workshops that will target all agricultural irrigators in the Virginia Coastal Plain. The purpose of these workshops is to work with irrigation managers on managing their programs in such ways as to minimize its impact on water quality.

Land Use Assessment - VDACS (§58.1-3234 Code of Virginia)

The Virginia Land Use Assessment law allows for local ordinances that provide landowners a special assessment tax rate for the preservation of agricultural, horticultural, forest or open space lands. To qualify for agricultural or horticultural use, landowners must certify that the land in question is being used in a planned program of soil management and soil conservation practices.

Noxious Pest Prevention - VDACS

Certain types of pests are very hard to control, and if they become established in a state, the amount of pesticides used in trying to control them tends to increase significantly. The Virginia Pest Law is intended to keep certain plant pests, such as gypsy moth, fire ant and brown snail from entering or expanding their populations in the commonwealth due to their highly noxious nature. For pests not yet established in Virginia, the program contains emergency response activities. VDACS enforces this regulatory program, often with educational and reporting assistance from VCE.

Nursery Inspection Program - VDACS (§3.1-188.32 to 3.1-188.49 Code of Virginia)

Under the Plants and Plant Products Inspection Law, each nursery in Virginia is subject to an inspection for plant pests at least annually during which all evident pests in the nursery's stock as well as the level of infestation is noted. Treatment is either recommended or required based on the degree of infestation. IPM is utilized to the extent practicable and is required by product labeling. This program has the effect of reducing the amount of pesticides used in nurseries and fosters the use of IPM. VDACS enforces this law and all of its pesticide application recommendations and requirements are based on the encyclopedic *Pest Management Guide* published by Virginia Cooperative Extension.

Nutrient Management Program - DCR

The nutrient management program's goal is to encourage the proper land application and efficient use of fertilizers, manures, sewage sludges, and other nutrient sources utilized for agricultural and urban purposes, in order to protect and improve the quality of Virginia's ground and surface waters. The program utilizes nutrient management field specialists located statewide and program management personnel to develop or review voluntary, incentive based or regulatory nutrient management plans, conduct educational programs for farmers, demonstrate nutrient management techniques, and assist farmers in soil nitrate testing, manure testing, and nutrient applicator calibration. Program staff are responsible for review and approval of nutrient management plans for VPA and poultry waste permits, and provide technical comments to VDH staff on biosolids use permits.

Nutrient Management Training and Certification Program
- DCR (§10.1-104.2 *Code of Virginia*,
4 VAC 5-15-10 et. seq.)

This voluntary program is operated to provide training and certify the competence of persons who prepare nutrient management plans. To be eligible for certification, an individual must meet education and experience requirements, achieve a passing score on both a core and practical examination and maintain the required continuing education requirements. Certified individuals who develop nutrient management plans are required to develop plans consistent with promulgated technical criteria and must provide summary reports to DCR annually. A random sample of the plans prepared by each certified nutrient management planner is reviewed by the department annually for compliance. Certificates may be revoked if plans do not meet the criteria contained in the Nutrient Management Training and Certification Regulations (4 VAC-5-15-10 et. seq.)

Nonpoint Source Pollution Education - VCE

Virginia Cooperative Extension, through area extension agents, provides educational information to farmers and landowners through workshops, field days, demonstrations, tours, newsletters and one-on-one contacts. Agents often coordinate their efforts with staffs from cooperating agencies. These educational

events focus on current, local nonpoint issues of concern.

Nonpoint Source Pollution Research - VPI&SU

Faculty at VPI&SU work in a coordinated effort with DCR and other agencies to conduct applied research as needed to address nonpoint source pollutant risk factors. This research helps by developing new and improved ways of managing production systems that will have less potential to pollute surface and ground water. As the results from applied research occurs, information is transferred to farmers through extension agents in the field. In the past, this type of research has led to important new tools for the farmer including nitrogen soil testing methods, the Virginia Land Use Evaluation system, the NutMan computer program for nutrient management planning and others.

Nonpoint Source Pollution Research - VSU

Research being conducted at VSU's Randolph Farm includes wetland establishment, nutrient management and pesticide runoff abatement. A wetland site has been built next to the Virginia Cooperative Extension Pavilion at the farm for demonstration purposes. Selected grass species are being grown in the vicinity of the wetland for nutrient and pesticide entrapment demonstrations. Switch grass (*Panicum virgatum* L.) is being used at the wetland site and in the green house for the entrapment of pesticides from agricultural runoff. Scientists at VSU are engaged in evaluating the effectiveness of vegetative filter strips to retard atrazine runoff from agricultural soils. They are also determining the fate of such pesticides once they have moved off-site into the sediment/water system. Nutrient management research was initiated by in-house support through the USDA-Evans Allen program. The focus of the research is to evaluate sources of nitrogen and phosphorus from land application of confined animal manures and biosolids. The goal is to attenuate nitrogen and phosphorus mobility in manure-amended morphologically diverse mid-Atlantic soils. The entrapment of nutrients in manure-amended soils is also being evaluated using environmentally friendly agricultural and non-agricultural chemicals. The overall goal of the NPS and pesticide research programs at VSU's Randolph Farm are to generate BMPs for safe

and profitable application of manure and pesticides on agricultural land.

Pesticide Applicator Certification - VDACS, VCE (§3.1-249.52 *Code of Virginia*)

The mishandling of chemical pesticides because of a lack of knowledge about their proper use could lead to unnecessary threats to human health, animal health and the environment. To reduce the risk of unnecessary and potentially tragic accidents, both federal and state law require the users of the more potent pesticides to pass a certification test in order to use those pesticides. In addition, some types of applications, such as those by pest control companies, require certification - regardless of the potency of the product - to protect the general public. VDACS enforces these requirements, and VCE develops educational programs and materials.

Pesticide Clean Days - VDACS, VCE

VDACS and VCE support an ongoing program to collect unwanted pesticides for disposal in facilities designed and licensed to handle hazardous waste properly. This program reduces the quantity of potential toxic pollutants within the commonwealth. More than 639,800 pounds of unwanted pesticides have been disposed of since this voluntary program began in 1990. This service has been provided to all of Virginia's counties and cities. VDACS and VCE are the lead agencies in making this happen annually, often with support from DCR and DEQ.

Pesticide Container Recycling - VDACS, VCE

VDACS conducts a voluntary plastic pesticide container recycling program that collects empty containers from growers and commercial agricultural users for processing into useful items (e.g. plastic shipping pallets), thus preventing another possible source of environmental pollution.

Pesticide Record Keeping - VDACS, VCE

Certain regulations require the keeping of records of

when and how much pesticide product was applied, among other things. VDACS works cooperatively with the U.S. Environmental Protection Agency to insure that applicators of Restricted Use Pesticides (RUPs) are properly certified, and that all pesticides are used and handled according to label directions. VDACS works with the U.S. Department of Agriculture to insure that growers maintain adequate records of their RUP applications. Under a federal rule, the Worker Protection Standard, greater record-keeping is also required on farms where 10 or more farm workers are employed. VDACS enforces these rules, and VCE helps develop the educational programs and materials to train farmers.

Pesticide Storage and Handling - VDACS, VCE

Farmers and any other users of pesticides are prohibited from handling, transporting, storing or distributing any pesticide in a manner that may endanger humans, the environment, food or feed. In addition, pesticide labels often contain specific instructions regarding storage and handling of the product. No pesticide user, whether farmer, commercial applicator or other, may use a pesticide in a manner inconsistent with the label. Virginia regulation requires that pesticide application equipment be properly

calibrated to prevent over-application. These regulations also require the use of back-flow preventers to protect water supply systems, wells, streams and lakes. VDACS enforces these requirements, and VCE develops educational programs (e.g., for those studying for certification) for pesticide users' awareness.

Poultry Waste Permits - DEQ, DCR (§62.1-44.17:1.1 Code of Virginia)

Beginning in 2001, poultry operations with at least 200 animal units (20,000 broilers or 11,000 turkeys) will be required to operate in compliance with a poultry waste permit. The permits will require producers to implement DCR-approved nutrient management plans, proper waste storage methods, and waste tracking and accounting procedures. Regulations are currently under development.

Precision Nutrient and Pesticide Application Equipment Tax Credit - DCR (§58.1-337 and §58.1-436 Code of Virginia)

This incentive program provides a 25 per cent state income tax credit up to \$3,750 annually to encourage farmers to purchase more accurate nutrient and pesticide application equipment which meets state specifications. Eligible equipment categories include: manure spreaders, pneumatic fertilizer applicators, sprayers for pesticides or liquid fertilizers, tramline equipment, and starter fertilizer attachments for planters. The program also requires the farmer to have a nutrient management plan.

Rotational Grazing/Livestock Exclusions - VCE, NRCS

This educational program promotes the use of intensive grazing with beef and sheep producers. When implemented on the farm, this program is intended to reduce erosion, to fence cattle out of nearby streams and to reduce inorganic nutrient inputs into the waterway. Currently, this is a cost-shared practice under the Virginia cost-share program. NRCS also promotes this program in its conservation outreach efforts.

Rotational Loafing Lot Management - VCE, NRCS

Virginia Cooperative Extension promotes this cost-

shared BMP in its educational programs, with NRCS providing the technical expertise for the practice. This practice allows dairy farmers to rotate their cow herd from paddock to paddock during the loafing times between milkings. This practice results in the exclusion of cattle from streams, reducing erosion and polluted runoff and a more efficient milking system for the dairy farmer since the cows are cleaner. This BMP is an important part of the tributary strategies associated with cleaning up the Chesapeake Bay.

Virginia Pollution Abatement (VPA) Animal Waste Permits - DEQ, DCR (§62.1-44.17:1 Code of Virginia, 9 VAC 25-32-10)

Virginia Pollution Abatement (VPA) permits are regulatory in nature and are issued by DEQ for activities that manage wastes, which could impact state water quality but do not discharge directly to surface waters. VPA permits are issued for animal feeding operations with 300 or more animal units. This impacts agricultural operations having at least 300 beef cattle, 200 dairy cattle or 750 swine weighing more than 55 pounds in confinement. Smaller operations may be required to obtain a permit if they are known to cause water pollution. VPA permits address management of wastewater, runoff from storm events and solids/sludges so there is no point source discharge of pollutants to surface waters under all conditions up to and including the 25-year, 24-hour storm event. Permit restrictions and requirements may include ground water monitoring. These permits require an enforceable, site-specific DCR-approved nutrient management plan to address proper waste storage, rate of waste application and timing of application. The permit term maximum is 10 years, however nutrient management plans required by the permits must be revised every three years. Regulated farms are inspected at least annually. In addition to complying with all conditions of the permits, producers must attend training sessions at least once every three years. Pathogens are addressed through controls on waste storage and land application to prevent runoff.

Virginia Pollution Abatement (VPA) Industrial Waste Land Application Permits - DEQ (§62.1-44.15 Code of Virginia, 9 VAC 25-32-10 et. seq.)

This type of pollutant management activity typically involves land application of industrial waste to crop land or forest land. The rate of industrial waste application is determined by the amount of nutrients or toxic materials present based on the most restrictive constituent in the

waste, soil type, and the crop to be grown on the site. Nutrients are applied at agronomic rates.

Virginia Pollutant Discharge Elimination System Permits (VPDES) - DEQ
(§62.1-44.15 *Code of Virginia*, 9 VAC 25-31-10 et. seq.)

VPDES permits are regulatory controls on point source discharges of pollutants to surface waters. When a municipal sewage treatment plant chooses to be responsible for the use and disposal of its sewage sludge/biosolids, the VPDES permit contains conditions regulating that activity. Sludge management plans in VPDES permits regulate the rate at which sludge can be land applied to crop land based on both the nutrient content of the sludge and the amount of heavy metals it contains. Nutrients are applied at agronomic rates. Treatment for pathogen control is also addressed in the sludge management plan. The metals and pathogen controls conform to those in the federal 40 CFR Part 503 Sludge Use and Disposal Regulation.

Virginia Revolving Loan Fund - DEQ
(§62.1-229.1 *Code of Virginia*)

Agricultural BMPs will be eligible for funding under the Virginia Revolving Loan Fund. The 1999 General Assembly passed legislation allowing DEQ to provide loans to address NPS pollution from agricultural activities.

DEQ will prioritize applications for loan assistance on a statewide basis. Applications for practices that are expected to provide the greatest water quality benefit will be given the highest funding priority. Applications considered to impact segments on the 303(d) Impaired Waters List will receive high priority. Those impacting waters on the 305(b) Threatened List,

DCR high priority waters, or the Nutrient Enriched Waters List will receive a medium priority rating. All other applicants will be given lower priority.

Water Well Testing Program - VCE

This is an educational program that teaches rural homeowners about potential pollution problems that may be associated with their home water supply. Local extension agents coordinate the program and provide educational information to rural homeowners on safety issues dealing with their home water supply that comes from ground water.

Wetland Reserve Program (WRP) - NRCS, FSA

This voluntary program is designed to restore and protect wetlands on private property. The program includes financial assistance to enhance wetland and financial incentives to sell a conservation easement to USDA. The landowner retains ownership, but agrees to limit future use of the land.

Wildlife Habitat Incentives Program (WHIP) - NRCS, FSA, DGIF

This is a voluntary program to provide technical and financial assistance to develop and enhance habitat for upland wildlife, wetland wildlife, threatened and endangered species, fish and other types of wildlife.

Karst Groundwater Program

This program provides technical assistance to landowners, SWCDs, and agencies on NPS problems associated with karst subsidence, habitat management, and groundwater quality and quantity.

**ASSESSMENT OF EXISTING PROGRAMS ADDRESSING POLLUTANTS
IN EACH SOURCE SUBCATEGORY**

N = Nutrients S = Sediments T = Toxics P = Pathogens

| Existing Program | Confined Animal Feeding Operations | Livestock on Pasture | Field Crops | Vegetables | Orchards & Vineyards | Nurseries and Ornamentals |
|---|---|-------------------------|-------------|------------|-------------------------|---------------------------------|
| Ag BMP Tax Credit - DCR, SWCDs | N, S, T, P | N, S, T, P | N, S, T, P | N, S, T, P | N, S, T, P | N, S, T, P |
| Ag BMP Cost-Share Program - DCR, SWCDs | N, S, P | N, S, P | N, S | N, S | | |
| Agricultural Stewardship Act - VDACS, SWCDs | N, S, T | N, S, T | N, S, T | N, S, T | N, S, T | N, S, T |
| Animal Disease Control and Prevention - VDACS | P | P | | | | |
| Biosolids Use Regulations - VDH | | N, P | N, P | | | |

| Chesapeake Bay Pres. Act - CBLAD, SWCDs | | N, S, T | N, S, T | N, S, T | N, S, |
|--|---|-----------------------------|--------------------|-------------------|------------------|
| Conservation Reserve Program - NRCS, FSA | | | N, S, T | N, S, T | |
| NPS Education - VCE, SWCDs | N, S, T, P | N, S, T, P | N, S, T | N, S, T | T |
| Environmental Quality Incentives Program (EQIP) - NRCS, FSA | N, S, P | S | S | | |
| Farm*A*Syst - VCE | N, S, T, P | N, S, T, P | N, S, T | N, S, T | N, S, |
| Food Security Act/Conservation Compliance - NRCS, FSA | | | S | | |
| Ground Water Withdrawal Regulations - DEQ | N, T, P | | N, S, T | N, S, T | |
| Integrated Pest Mgt. (IPM) Implementation - VCE | | T | T | T | T |
| Irrigation Water Management - VCE | | | N, S, T | N, S, T | |
| Land Use Assessment - VDACS | | S | S | S | S |
| Noxious Pest Prevention - VDACS | | T | T | T | T |
| Nursery Inspection Program - VDACS | | | | | |
| Existing Program | Confined Animal Feeding Operations | Livestock on Pasture | Field Crops | Vegetables | Orch Vine |
| Nutrient Management Program - DCR | N | N | N | N | N |
| Nutrient Mgt. Training & Certification - DCR | N | N | N | N | |
| Pesticide Record Keeping - VDACS, VCE | T | T | T | T | T |
| Pesticide Storage/Handling - VDACS, VCE | T | T | T | T | T |
| Pesticide Applicator Certification -VDACS,VCE | T | T | T | T | T |
| Pesticide Clean Days - VDACS, VCE | T | T | T | T | T |
| Pesticide Container Recycling - VDACS, VCE | T | T | T | T | T |
| Poultry Waste Permits - DEQ, DCR | N, P | | | | |
| Precision Nutrient and Pesticide Application Equipment Tax Credit - DCR, SWCDs | N, T | N, T | N, T | N, T | N, T |
| NPS Research - VPI&SU, VSU, DCR | N, S, T, P | N, S, T, P | N, S, T, P | N, S, T, P | N, S, |
| Rotational Loafing Lot Mgt. - NRCS, VCE | N, S, P | | | | |
| Rotational Grazing - NRCS, VCE | | S | | | |
| Virginia Revolving Loan Fund - DEQ | N, S, T, P | N, S, T, P | N, S, T, P | N, S, T, P | N, S, |

| | | | | | |
|--|------|---------|---------|---------|-------|
| VPA Industrial Waste Land App. Permits - DEQ | | N, P, T | N, P, T | | |
| VPA Animal Waste Permits - DEQ, DCR | N, P | | | | |
| VPDES Sewage Sludge Permits - DEQ | | N, P | N, P | | |
| Water Well Testing Program - VCE | P | P | | | |
| Wetland Reserve Program (WRP) NRCS, FSA | | N, S, T | N, S, T | N, S, T | N, S, |
| Wildlife Habitat Incentives Program (WHIP) - NRCS, FSA | | | S | S | S |

OBJECTIVES (SHORT-TERM GOALS)

The agriculture work group identified nine objectives (short-term goals) to support and implement the five long-term goals. Strategies and tasks were formulated by agency representatives and target dates were set in order to achieve a successful NPS pollution management approach for agriculture. The objectives are listed below and detailed in the tables that follow. (For additional strategies, objectives, and tasks regarding implementation of agriculture management measures in the coastal zone refer to Chapter XIII Coastal Nonpoint Source Pollution Control Program.)

Objective 1. Provide assistance to producers to ensure that farms accounting for 60 per cent of the state's total number of beef, dairy and swine animals in confinement will have adequate waste management systems and nutrient management plans by 2004

Objective 2. Provide assistance to ensure that poultry farms with 200 or more animal units will implement nitrogen-based and phosphorus-based nutrient management plans, proper waste storage practices, and waste tracking and accounting procedures by 2004

Objective 3. Provide assistance to farmers to ensure that controlled stream access practices will be installed on 30 per cent of livestock grazing operations for stream segments where pathogens, sediment, or nutrients from grazing livestock are contributing to an impairment by 2004

Objective 4. Ninety percent (90 per cent) of highly erodible cropland will be managed in accordance with NRCS conservation plans in watersheds where agricultural sediment is contributing to an impairment, or as necessary where basin management plans identify specific sediment reduction goals, by 2004

Objective 5. By 2004, nutrient management plans will be developed as required where basin management plans identify specific agricultural nutrient reduction targets

Objective 6. Agricultural sources of toxics will be controlled by maintaining and implementing IPM and pesticide management programs and regulations to protect ground and surface water quality statewide, and to minimize effects on human and wildlife populations

Objective 7. Sixty percent (60 per cent) of farm acreage in irrigated cropland will implement improved irrigation scheduling practices by 2004

Objective 8. Thirty percent (30 per cent) of production facilities in the container nursery and greenhouse industry will use containment systems to trap sediment and recycle nutrients or implement BMPs of equivalent effectiveness by 2004

Objective 9. Technical and administrative program capabilities will be enhanced to address potential pollution concerns originating from confined animal feeding operations, livestock grazing, cropland management, and nursery and ornamental operations through 2004

TABLES OF OBJECTIVES & STRATEGIES

Goal 1 - Confined Animal Feeding Operations

Maintain existing beneficial uses in unimpaired state waters and restore beneficial uses in surface waters where confined animal feeding operations are contributing to a water quality impairment caused by sediment, nutrients or pathogens as listed in the 303d TMDL Priority List Report, or where ground water contaminants originating from confined animal feeding operations exceed the state ground water standard, by 2014

| OBJECTIVE 1 | | | |
|--|------------------------------|--------------------|------------------------------|
| <i>Provide assistance to producers to ensure that farms accounting for 60 per cent of the state's total number of beef, dairy and swine animals in confinement will have adequate waste management systems and nutrient management plans by 2004</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 1.1 Provide nutrient analysis for 500 manure samples annually to support the nutrient management program | •DCR | Annual | •Bay Imp Grant •319 Grant |
| 1.2 If voluntary measures are not successful in meeting beneficial uses, VPA permits will be issued to operations with fewer than 300 animal units of beef, dairy or swine that contribute to a water quality impairment | •DEQ •DCR | Ongoing | •General Fund |

| 1.3 Mandatory training sessions for VPA animal waste general permit registrants will be given | •DCR •VPI&SU •DEQ | Ongoing | •General Fund |
|--|--------------------------------|--------------------|--|
| 1.4 The DEQ animal waste permit inspection staff and the DCR nutrient management staff will meet at least annually to discuss technical and administrative procedures related to VPA permits | •DEQ •DCR | Annual | •General Fund |
| 1.5 Animal waste management systems will be installed on 70 farms annually through the Agricultural BMP Cost-share program | •DCR •SWCDs | Ongoing | •General Fund •Bay Imp Grant |
| 1.6 State and federal grant funds will be utilized to encourage innovative projects capable of NPS pollution abatement, such as feed management strategies to reduce livestock nutrient excretion | •DCR | •Ongoing | •General Fund •WQIA •Bay Imp Grant •319 Grant |
| OBJECTIVE 1 (Cont.) | | | |
| <i>Provide assistance to producers to ensure that farms accounting for 60 per cent of the state's total number of beef, dairy and swine animals in confinement will have adequate waste management systems and nutrient management plans by 2004</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 1.7 Agricultural Stewardship Act complaints will be investigated and corrective action taken on all founded complaints to address pollution problems | •VDACS •SWCDs | Ongoing | •General Fund |
| 1.8 Evaluate potential incentive programs to assist producers in the transition to phosphorus based nutrient management plans for non-poultry operations, such as encouraging new techniques for waste management | •DCR •VDACS •DEQ •VCE | Ongoing | •Unknown |
| 1.9 Participate in research addressing airborne ammonia at confined animal feeding operations as a member of Mid Atlantic Regional Air Management Association | •DEQ | Ongoing | •EPA |

| 1.10 The DCR cost-share program for regulated farms will be evaluated for potential revision in view of the transition from primarily a voluntary based agricultural NPS programs toward more regulatory programs and the increased available funding | •DCR | 2000 | •General Fund •Bay Imp Grant |
|---|------------------------------|--------------------|---------------------------------|
| 1.11 Virginia Pollution Abatement (VPA) permits will be issued for farms with 300 or more animal units of beef, dairy or swine in confinement | •DEQ •DCR | 2000 | •General Fund |
| 1.12 A phosphorus site index which considers phosphorus soil test levels and runoff characteristics of fields will be developed | •DCR •VPI&SU | 2003 | •Bay Imp Grant |
| 1.13 Nutrient management training and certification regulations will be revised to reflect technology available to date | •DCR | 2003 | •State Training & Cert. Fund |
| 1.14 New and newly revised voluntary or regulatory nutrient management plans will incorporate the use of phosphorus management practices | •DCR | 2004 | •General Fund |
| OBJECTIVE 2 | | | |
| <i>Provide assistance to ensure that poultry farms with 200 or more animal units will implement nitrogen-based and phosphorus-based nutrient management plans, proper waste storage practices, and waste tracking and accounting procedures by 2004</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 2.1 Provide nutrient analysis for 500 manure samples annually to support the nutrient management program | •DCR | Ongoing | •Bay Imp Grant •319 Grant |
| 2.2 Mortality composters will be installed on a minimum of 30 farms annually through the Virginia Agricultural BMP Cost-Share Program | •DCR •SWCDs | Ongoing | •General Fund •Bay Imp Grant |

| 2.3 State and federal grant funds will be utilized to encourage innovative projects capable of NPS pollution abatement | •DCR | Ongoing | •General Fund •WQIF •Bay Imp Grant •319 Grant |
|---|-----------------------------------|--------------------------------|--|
| 2.4 The DCR cost-share program for regulated farms will be evaluated for potential revision in view of the transition from primarily a voluntary based agricultural NPS programs toward more regulatory programs and the increased available funding | •DCR | 2000 | •General Fund •Bay Imp Grant |
| 2.5 Poultry waste regulations stipulating proper waste storage, nutrient management, and waste tracking and accounting requirements will be promulgated | •DEQ | 2000 | •General Fund |
| 2.6 The nutrient management plan computer software will be upgraded to enable phosphorus-based nutrient management plans and software will be supported for public/private sector planners | •VPI&SU | 2000 support ongoing 2001-2004 | •Bay Imp Grant |
| 2.7 A poultry litter transport and/or alternative use cost-share program will be presented to the Virginia General Assembly | •DCR •VDACS •DEQ •VPI&SU | 2001 | •General Fund |
| OBJECTIVE 2 (Cont.) | | | |
| <i>Provide assistance to ensure that poultry farms with 200 or more animal units will implement nitrogen-based and phosphorus-based nutrient management plans, proper waste storage practices, and waste tracking and accounting procedures by 2004</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 2.8 Regulated poultry farms (approximately 1,100 farms) will comply with the poultry waste regulations including nitrogen based nutrient management plans | •DEQ •DCR | 2001 | •General Fund |

| | | | |
|--|------|--------------------------|------------------|
| 2.9 New poultry facilities or revised nutrient management plans for existing facilities will be required to be developed on a nitrogen and phosphorus basis after 10/1/01 with all existing poultry plans converted by 10/1/04 | •DCR | Ongoing 2001- 2004 | •General Fund |
| 2.10 Poultry litter land application research and the water quality impacts from poultry litter will be evaluated and nutrient management plan regulations revised as needed | •DCR | 2004 | •General Fund |

Goal 2 - Livestock Grazing

Maintain existing beneficial uses in unimpaired state waters and restore beneficial uses in surface waters where livestock grazing operations are contributing to a water quality impairment caused by sediment, nutrients or pathogens as listed in the 303d TMDL Priority List Report, or where ground water contaminants originating from livestock grazing operations exceed the state ground water standard, by 2014

| OBJECTIVE 3 |
|---|
| <i>Provide assistance to farmers to ensure that controlled stream access practices will be installed on 30 per cent of livestock grazing operations for stream segments where pathogens, sediment or nutrients from grazing livestock are contributing to an impairment by 2004</i> |

| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
|---|----------------------------------|-------------|---|
| 3.1 Technical assistance will be provided to livestock producers to limit access of livestock to streams, rivers, lakes and other water bodies with targeting of assistance to impaired waters | •NRCS •SWCDs •VCE •DGIF | Ongoing | •USDA Federal appropriations •General Fund |
| 3.2 Cost-share assistance for BMPs will be provided to livestock producers to limit access of livestock to streams, rivers, lakes and other water bodies with targeting of assistance to impaired waters | •FSA •DCR •SWCDs | Ongoing | •USDA Federal appropriations •General Fund •Bay Imp Grant |
| 3.3 The Conservation Reserve Enhancement Program (CREP) will provide enhanced cost-share rates for BMP installation and increased rental payments to enroll up to 35,000 acres in riparian buffers | •DCR •FSA •DOF •VCE | 2004 | •General Fund |
| 3.4 Ten farmer educational meetings to promote limited stream access, alternative watering sources and related practices will be held annually | •VCE •DGIF | Ongoing | •General Fund •Bay Imp Grant •319 Grant |
| 3.5 Agricultural Stewardship Act complaints will be investigated and corrective action taken on all founded complaints to address pollution problems | •VDACS •SWCDs | Ongoing | •General Fund |
| OBJECTIVE 3 (Cont.) | | | |
| <i>Provide assistance to farmers to ensure that controlled stream access practices will be installed on 30 per cent of livestock grazing operations for stream segments where pathogens, sediment or nutrients from grazing livestock are contributing to an impairment by 2004</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |

| | | | |
|---|---|---------|---|
| 3.6 Use of DNA and other identification techniques to identify sources of impairments will be evaluated | <ul style="list-style-type: none"> •DCR •VPI&SU •VSU •JMU | Ongoing | <ul style="list-style-type: none"> •TMDL Funds •Bay Imp Grant •319 Grant |
| 3.7 Conservation plans will be developed on 96,000 acres of pasture annually | <ul style="list-style-type: none"> •NRCS | Ongoing | <ul style="list-style-type: none"> •USDA Federal appropriations |
| 3.8 The Environmental Quality Incentives program (EQIP) will target cost-share assistance to priority watersheds where uncontrolled livestock access to streams has impaired water quality | <ul style="list-style-type: none"> •NRCS •FSA | Ongoing | <ul style="list-style-type: none"> •USDA Federal appropriations |
| 3.9 Agencies will coordinate with local farm interest groups to encourage greater outreach and BMP implementation where livestock grazing operations contribute to a water quality impairment | <ul style="list-style-type: none"> •DCR •DEQ •VCE •DGIF | Ongoing | <ul style="list-style-type: none"> •General Fund •Bay Imp Grant •319 Grant |

Goal 3 - Cropland Management (includes field crops, vegetables, orchards and vineyards)

Agricultural cropland will be managed in ways which maintain or restore beneficial uses in surface waters and protect water quality in ground water by controlling losses of sediment to surface waters and losses of nutrients and toxics to ground and surface waters by 2014

| OBJECTIVE 4 | | | |
|---|------------------------------|--------------------|---|
| <i>Ninety percent (90 per cent) of highly erodible cropland will be managed in accordance with NRCS conservation plans in watersheds where agricultural sediment is contributing to an impairment, or as necessary where basin management plans identify specific sediment reduction goals, by 2004</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 4.1 Conservation plans will be developed on 96,000 acres annually | •NRCS •CBLAD | Ongoing | •USDA Federal appropriations •General Fund |
| 4.2 Approximately 7,000 acres annually will be enrolled in the Conservation Reserve Program (CRP) | •FSA •NRCS | Ongoing | •USDA Federal appropriations |
| 4.3 Sites will be evaluated for compliance with Chesapeake Bay Preservation Act requirements on 35,000 acres annually | •CBLAD •SWCDs | Ongoing | •General Fund |
| 4.4 Technologies which promote and encourage greater use of conservation tillage will be integrated into 30 farmer workshops annually | •VCE | Ongoing | •General Fund |
| 4.5 Agricultural Stewardship Act complaints will be investigated and corrective action taken on all founded complaints to address pollution problems | •VDACS •SWCDs | Ongoing | •General Fund |

| 4.6 Projects to develop or evaluate BMPs which may reduce NPS impacts from plasticulture will be solicited | •DCR | 2001 | •General Fund •WQIF •Bay Imp Grant •319 Grant •CZARA |
|---|------------------------------|--------------------|--|
| OBJECTIVE 4 (Cont.) | | | |
| <i>Ninety percent (90 per cent) of highly erodible cropland will be managed in accordance with an NRCS conservation plan in watersheds where agricultural sediment is contributing to an impairment, or as necessary where basin management plans identify specific sediment reduction goals, by 2004</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 4.7 Conservation plans on highly erodible land (HEL) cropland will be maintained and updated as needed in order for producers to maintain eligibility for USDA Federal appropriations program benefits | •NRCS | Ongoing | •USDA Federal appropriations |

| OBJECTIVE 5 | | | |
|---|------------------------------|--------------------|---|
| <i>Nutrient management plans will be developed as required where basin management plans identify specific agricultural nutrient reduction targets by 2004</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 5.1 Nutrient management plans will be developed or revised on 60,000 acres annually | •DCR •SWCDs •VCE | Ongoing | •Bay Imp Grant •319 Grant •General Fund |
| 5.2 Biosolids Use permits will be issued and enforced | •VDH | Ongoing | •General Fund |

| 5.3 Cereal grain cover crops will be enrolled on 1,000 acres annually through the Agricultural BMP Cost-Share Program | •DCR •SWCDs | Ongoing | •General Fund •Bay Imp Grant |
|--|------------------------------|--------------------|---|
| 5.4 Agricultural Stewardship Act complaints will be investigated and corrective action taken on all founded complaints to address pollution problems | •VDACS •SWCDs | Ongoing | •General Fund |
| 5.5 Virginia Tech will offer no-cost soil analysis for commercial farms contingent on adequate biannual appropriations from the General Assembly | •VPI&SU | Ongoing | •General Fund |
| OBJECTIVE 5 (Cont.) | | | |
| <i>Nutrient management plans will be developed as required where basin management plans identify specific agricultural nutrient reduction targets by 2004</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 5.6 Expansion of nutrient management plan development, cost-share and implementation incentives will be evaluated for coverage into the lower bay tributaries and statewide | •DCR | 2000 | •General Fund •Bay Imp Grant |
| 5.7 The Nutrient Management Handbook will be revised to reflect technology available to date and to eliminate duplicate material contained in companion documents | •DCR | 2001 | •319 Grant |
| 5.8 Biosolids Use Regulations will be revised to include revised criteria for temporary on-site covered storage and nutrient management plans | •VDH •DCR | 2001 | •General Fund |
| 5.9 Nutrient management plans will be required for all new or reissued VPDES and VPA permitted activities involving land application of sewage sludge or industrial waste containing nitrogen and phosphorus | •DEQ •DCR | 2001 | •Bay Imp Grant •319 Grant •General Fund |

| | | | |
|---|----------------------|------|--|
| 5.10 Nutrient management training and certification regulations will be revised to reflect technology available to date | •DCR | 2004 | •State Training and Certification Fund |
| 5.11 Phosphorus management requirements will be incorporated into Biosolids Use permits, VPDES sludge permits, and VPA Industrial Waste Permits that authorize nutrient application to cropland | •VDH •DEQ •DCR | 2004 | •General Fund |

| OBJECTIVE 6 | | | |
|---|-------------------|-------------|---------------------------------------|
| <i>Agricultural sources of toxics will be controlled by maintaining and implementing IPM and pesticide management programs and regulations to protect ground and surface water quality statewide, and to minimize effects on human and wildlife populations</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 6.1 Pesticide Clean Days to collect and dispose of unwanted pesticides will continue on a county-by-county or regional basis as needs and funding dictate | •VDACS •VCE | Ongoing | •General Fund •FIFRA •319 Grant |
| 6.2 IPM concepts will be incorporated as part of the pesticide licensing and certification requirements and will continue to be integrated into recertification educational training sessions | •VDACS •VCE | Ongoing | •General Fund •FIFRA •USDA |
| 6.3 Agricultural Stewardship Act complaints will be investigated and corrective action taken on all founded complaints to address pollution problems | •VDACS •SWCDs | Ongoing | •General Fund |
| 6.4 Applied research will continue, utilizing IPM concepts that can be incorporated into farming operations resulting in improved implementation of IPM on farms | •VPI&SU •VSU | Ongoing | •Unknown |
| 6.5 Field days, demonstrations, workshops and test plots will be utilized to teach and promote the use of IPM with the agriculture industry | •VCE | Ongoing | •General Fund |

| | | | |
|--|--------|------|---------------|
| 6.6 Request funding to reinstate a beneficial insect breeding and distribution program | •VDACS | 2001 | •General Fund |
|--|--------|------|---------------|

| OBJECTIVE 7 | | | |
|--|-------------------|-------------|-----------------|
| <i>Sixty percent (60 per cent) of farm acreage in irrigated cropland will implement improved irrigation scheduling practices by 2004</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 7.1 A publication will be developed and series of farmers workshops held on proper irrigation scheduling techniques | •VPI&SU | 2000 | •CZARA |
| 7.2 Guidance will be developed for water conservation and management plans as required in ground water withdrawal permits | •DEQ | 2001 | •General Fund |

Goal 4 -Nursery and Ornamentals Management

Commercial nursery and ornamental operations will be managed in ways which maintain or restore beneficial uses in surface waters and water quality in ground water by controlling losses of sediment to surface waters and losses of nutrients and toxics to ground and surface waters by 2014

| OBJECTIVE 8 | | | |
|---|--------------------------------|-------------|-----------------|
| <i>Thirty percent (30 per cent) of production facilities in the container nursery and greenhouse industry will use containment systems to trap sediment and recycle nutrients or implement BMPs of equivalent effectiveness by 2004</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 8.1 Develop and recommend potential container nursery and greenhouse runoff containment and recycling BMPs for inclusion into the Virginia Agricultural BMP Cost-Share Program | •DCR | 2000 | •Unknown |
| 8.2 Develop guidelines for nutrient management plans and soil and water quality conservation plans for container nursery and greenhouse operations | •DCR •CBLAD •DEQ •VCE | 2000 | •Unknown |


| | | | |
|--|------------------------|-----------|----------------------------------|
| 8.3 Conduct a monitoring study of water quality in areas adjacent to container nursery and greenhouse operations | •DEQ | 2000-2002 | •General Fund •319 Grants |
| 8.4 Incorporate container nursery and greenhouse runoff containment and recycling BMPs as an eligible practice for existing operations in the Virginia Agricultural BMP Cost-Share Program | •DCR | 2001 | •General Fund • Bay Imp Grant |
| 8.5 Evaluate the need to develop additional programs to address pollutants contained in container nursery and greenhouse runoff and leachate | •DEQ •DCR •CBLAD | 2003 | •Unknown |

Goal 5 - Agricultural NPS Pollution Program Development

Continue to develop and implement agricultural nonpoint source (NPS) programs to effectively prevent and reduce pollution in ground and surface waters through 2014

| OBJECTIVE 9 | | | |
|---|-------------------------|-------------|---------------------------------|
| <i>Technical and administrative program capabilities will be enhanced to address potential pollution concerns originating from confined animal feeding operations, livestock grazing, cropland management, and nursery and ornamental operations through 2004</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 9.1 Applied research projects which are expected to develop new techniques which can reduce the potential for nonpoint source pollution from agricultural sources, or which are expected to result in more accurate estimation techniques for BMP effectiveness as compared to current techniques, will be encouraged and funding mechanisms explored | •DCR •VPI&SU •VSU | Ongoing | •General Fund •Bay Imp Grant |

| | | | |
|---|---|--------------------|------------------------|
| 9.2 Training sessions utilizing case studies concerning the Agricultural Stewardship Act will be held annually for SWCD employees | •VDACS | Ongoing | •General Fund |
| 9.3 Periodic coordination meetings will be held between VDACS, DCR, and DEQ staff at the regional level to resolve common issues regarding agricultural pollution complaints | •VDACS •DEQ •DCR | Ongoing | •General Fund |
| 9.4 An interagency task force will be convened to evaluate technical assistance needs to implement NPS strategies | •DCR •NRCS •SWCDs •VDACS •CBLAD | 2001 | •Unknown |
| 9.5 A water quality monitoring project will continue in Mossy and Glade creeks to verify agricultural loadings for the bay watershed model | •DCR •VPI&SU | 2000 2001 | •Bay Imp Grant |
| OBJECTIVE 9 (Cont.) | | | |
| <i>Technical and administrative program capabilities will be enhanced to address potential pollution concerns originating from confined animal feeding operations, livestock grazing, cropland management, and nursery and ornamental operations through 2004</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |

| | | | |
|---|---|---|---|
| <p>9.6 The Virginia portion of the national cooperative soil survey will complete the inventory of Virginia's soils (field mapping)</p>  | <ul style="list-style-type: none"> •DCR •NRCS •VPI&SU | <p>2000: Bath, Buckingham, Patrick Counties</p> <p>2001: Franklin</p> <p>2002: Floyd, Russell, Scott, Sussex</p> <p>2003: Halifax</p> <p>2004: mapping in progress in all remaining counties (Bland, Brunswick, Buchanan, Craig, Dickerson, Highland, and Wise)</p> | <ul style="list-style-type: none"> •General Fund •USDA Federal appropriations |
| <p>9.7 Revised water quality standards for ground water will be proposed</p> | <ul style="list-style-type: none"> •DEQ | <p>2004</p> | <ul style="list-style-type: none"> •General Fund |
| <p>9.8 Incorporate revised ground water protection measures into state guidance documents for voluntary, incentive-based and regulatory programs</p> | <ul style="list-style-type: none"> •DEQ •DCR •VDACS •CBLAD •NRCS | <p>2004</p> | <ul style="list-style-type: none"> •General Fund •Bay Imp Grant •319 Grant |
| <p>9.9 The agricultural chapter of the NPS Management Plan will be revised every five years</p> | <ul style="list-style-type: none"> •NPSAC Agencies | <p>2004</p> | <ul style="list-style-type: none"> •319 Grant |

WORK GROUP MEMBERS & AGENCY/ORGANIZATION REPRESENTED

Agriculture

Department of Conservation & Recreation Facilitator
Mr. Russ Perkinson
Nonpoint Source Planning & Grants Program Manager
Mr. Rick Hill

Ms. Jody Aston
Department of Conservation & Recreation

Dr. Asmare Atalay
Virginia Cooperative Extension/Virginia State University

Mr. Dana Bayless
Department of Conservation & Recreation

Mr. Matt Bley
Department of Conservation & Recreation

Mr. Ken Carter
Natural Resources Conservation Service

Ms. Debbie Cross
Department of Conservation & Recreation

Mr. Mike Foreman
Department of Forestry

Ms. Linda Hagenau
The Environmental Interest Organization

Mr. Samuel Hamilton
Virginia Agribusiness Council

Ms. Ann Jennings
Chesapeake Bay Foundation

Mr. Larry Land
Virginia Association of Counties

Ms. Marilyn Layer
Virginia Association of Soil & Water Conservation Districts

Mr. Richard Ayers
Department of Environmental Quality

Mr. Victor Liu
Crater Planning District Commission

Ms. Mary Ann Massie
Department of Environmental Quality

Mr. Tim Maupin
Rocco

Ms. Sarah Pugh/Mr. Hunter Richardson
Virginia Department of Agriculture & Consumer Services

Ms. Donna Pugh-Johnson
Virginia Agribusiness Council

Dr. Willy Reay
Virginia Institute of Marine Science

Mr. David Sausville, Jr.
Ducks Unlimited, Inc.

Mr. Cal Sawyer
Virginia Department of Health

Mr. Randy Shank
Virginia Cooperative Extension

Ms. Kay Slaughter
Southern Environmental Law Center

Mr. Mark Slauter
Department of Conservation & Recreation

Mr. Dan Solomon
Natural Resources Conservation Service

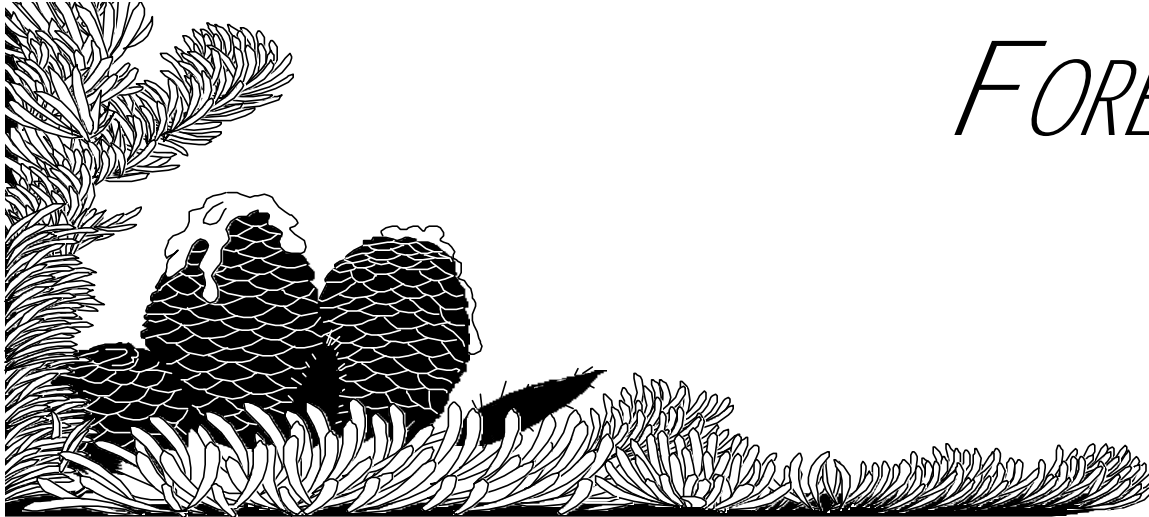
Mr. Wilmer Stoneman
Virginia Farm Bureau Federation

Mr. Eric Walberg
Hampton Roads Planning District Commission

Mr. Billy Wayson
Virginia Forage and Grassland Council

Mr. Stuart Wilson
Department of Conservation and Recreation

Mr. Ron Wood
Chesapeake Bay Local Assistance Department



FORESTRY

LONG-TERM GOALS (15- YEAR)

Goal 1 - Reduce nutrient and sediment pollution entering Virginia's waters through full implementation of the silvicultural water quality law

Goal 2 - Maintain reduced levels of all nonpoint source pollutants to sustain designated uses and achieve beneficial uses of waters of the commonwealth by 2015

INTRODUCTION

Virginia has approximately 16 million acres of forested land (63 per cent of the state). According to the *Forest Statistics for Virginia, 1992 resource bulletin*, approximately 79 per cent of forest land in Virginia comprises hardwoods such as oak and hickory, and the remaining 21 per cent consists of softwood species such as loblolly, Virginia and white pine. Approximately 43 per cent of the average annual harvest is softwood and 57 per cent is hardwood.

The primary pollutant associated with forestry operations is sediment resulting from soil loss. Forestry activities can accelerate soil erosion, depositing sediment into state waters. High sediment concentrations can smother bottom dwelling

organisms, damage aquatic plants and harm the gills of some fish species. Improper silvicultural practices can also lead to increases in water temperature due to the removal of vegetation adjacent to streams, nutrient enrichment and the introduction of toxic chemicals such as herbicides, pesticides and petroleum products.

Estimates by the Virginia Department of Forestry (DOF) staff indicate that silvicultural operations account for 5 per cent of the nonpoint source pollution affecting Virginia rivers. However, the potential for localized water quality impacts is significant where intensive forestry practices occur and best management practices (BMPs) have not been implemented. The *Virginia Nonpoint Source*

Pollution Watershed Assessment Report indicates that the pollution potential is greatest where forestry activities take place on steep slopes and highly erodible soils.

DOF is the lead state agency for the implementation of forestry nonpoint source programs. In cooperation with the forest industry, DOF has implemented an innovative forest NPS program which is supported by financial incentives such as cost-share programs. DOF NPS pollution programs stress voluntary BMPs to achieve sediment reduction and other nonpoint source pollution goals. This non-regulatory program is complemented by the Virginia Silvicultural Water Quality Law which gives DOF enforcement authority to issue stop work orders, levy fines and require corrective action to protect waters of the commonwealth from excessive sedimentation originating from forestry operations.

The basis of targeting a 40 per cent nutrient and sediment reduction goal for silvicultural activities is, in part, to support implementation of the goals established under the Chesapeake Bay Agreement and to achieve water quality benefits throughout the commonwealth. Once achieved, the reduction must be maintained and increased to the degree possible through additional efforts.

The Chesapeake Bay Local Assistance Department regulations governing tidewater localities address silvicultural operations within designated "resource protection areas" and "resource management areas." The USDA Forest Service, George Washington and Jefferson National Forests administer timber sales, reforestation and other silvicultural activities on their lands in western Virginia in full compliance with state programs.

As the lead nonpoint source pollution agency, the Department of Conservation and Recreation (DCR) works closely with DOF to coordinate nonpoint source pollution control initiatives. In particular, DCR provides grant funding for DOF program enhancement and implementation activities and works cooperatively with DOF on buffer initiatives. DOF staff are active participants in the Nonpoint source Advisory Committee and DCR staff are actively involved with the Silvicultural Water Quality Task Force.

Member companies of the American Forest and Paper Association (AF&PA) have committed to the Sustainable Forestry Initiative (SFI). This nationwide program has objectives that address nonpoint source pollution from silvicultural operations. Administration of SFI in Virginia is accomplished through the Virginia Forestry Association (VFA).

ISSUE IDENTIFICATION & PROGRAM ASSESSMENT

Timber harvesting in Virginia typically occurs only once or twice in a landowner's life since most thinning or harvesting occurs infrequently on a specific tract of forest land. As a consequence, only one percent of Virginia's forest land is harvested each year. However, land conversion to urban residential and commercial development and, in some cases, mining, highway construction or agriculture, also involves logging. It should be recognized that as land conversion occurs, affected acres convert to a different pollutant source category.

The Commonwealth of Virginia coordinates closely with the USDA Forest Service on a wide range of water quality and forest management issues. Forest Service staff are active participants in the state's Nonpoint Source Advisory Committee, and they coordinate with DOF staff on BMP development and tracking. For example, a memorandum of agreement (MOA) between USDA Forest Service and DOF is currently being developed that will help ensure coordination on forest management and water quality issues.

Additionally, Forest Service staff work closely with the Commonwealth of Virginia on development of forest plans that ensure Water Quality Standards and anti-degradation policies include provisions to remain consistent with state BMPs. Forest is managed to ensure it meets or exceeds preventative standards or BMPs.

Through the leadership of DOF and the Silvicultural Water Quality Task Force, an aggressive forestry NPS pollution program to address water quality has evolved since 1988. The primary components of Virginia's forestry NPS pollution program are listed below:

- C Continued innovative leadership, training and support through the Silvicultural Water Quality Task Force established during 1988 to provide a partnership of agencies, forest industry, educators and organizations to address water quality issues relevant to forestry in Virginia;
- C Enforcement of the Silvicultural Water Quality Law; *Code of Virginia* Chapter 11 of Title 10.1, article 12 §10.1-1181.1 through 10.1-1181.7, that gives the Department of Forestry the ability to stop harvesting operations, provide corrective action recommendations and impose civil fines if water quality degradation is occurring from sediment;
- C DOF inspects each harvesting operation exceeding 10 acres twice to provide technical guidance for the proper implementation of BMPs and to ensure compliance with the BMP Program and the Silvicultural Water Quality Law;
- C Consistent with the 1987 Chesapeake Bay Agreement, a sediment reduction goal of 40 per cent from forestry operations with interim goals of 10 per cent by 1991 and 30 per cent by 1995 were set;
- C Adoption of the position that DOF's main priority is the protection of water quality and the integration of BMPs into every silvicultural activity;
- C The installation of a statewide water quality monitoring program documenting the possible impacts of harvesting operations on water quality;

- C A cooperative agreement between consultant foresters and DOF has established the critical importance of maintaining water quality and implementing BMPs;
- C Adoption of the American Forest and Paper Association Sustainable Forestry Initiative Program to protect water quality by AF&PA members;
- C Establishment of a toll-free telephone number (1-800-939-LOGS) for loggers and landowners to contact DOF for on-site assistance, logging inspections and complaints;
- C Adoption in 1998 of a timber harvesting notification requirement;
- C Maintenance of an aggressive and successful forestry water quality educational and training program showing the potential impact of silvicultural activities and ways to prevent erosion and subsequent sedimentation through the implementation of forestry BMPs; and
- C Preharvest and BMP training are core components of SFI Program-sponsored SHARP Logger Training, which is designed to promote professionalism in logging and to improve environmental performance in harvesting operations. To date, 730 Virginia loggers, representing approximately 80 per cent of the commonwealth's timber harvest production capacity, have completed the training.

Pollution Source Activities and Source Categories

During early 1999, the Forestry Workgroup of state and federal officials, forest industry, conservation organizations and citizens was convened to assess current programs and develop the forestry NPS pollution chapter of the 1999 Virginia Nonpoint Source Pollution Management Program Update.

The workgroup determined that NPS pollution can occur through four types of forestry land use activity. Riparian restoration has been added because of new emphasis on this practice to limit NPS pollution. Leadership for the Virginia Chesapeake Bay Riparian Restoration Plan has been assigned to DOF. The five categories are listed and defined and pollutant source categories are listed in the tables on the following pages.

Harvesting

The main issues identified by the work group associated with harvesting activities are:

- Increase amount of pre-harvest planning
- Increase private sector role in pre-harvest planning
- Increase level of compliance with Silvicultural Water Quality Law
- Advance mountain logging techniques
- Use currently available technologies and logging techniques
- Current agency resources cannot address increases in forest harvesting

Pre-harvest Site Restoration

The main issues identified by the work group associated with pre-harvesting site restoration activities are:

- Proper BMP implementation during site preparation and reforestation is challenging because of the lag time following logging
- Increase BMP effectiveness in seeding, structural practices and stream crossings

Forest Maintenance

The main issues identified by the work group associated with forest maintenance activities are:

- Lack of road maintenance
- Inadequate stream crossings and water control structures

- Improper road locations
- Impacts of traffic in wet weather
- Risk of direct application of herbicides to surface waters
- Offsite sprays and their effect on streamside management zones
- Provide adequate precautions to prevent spills
- Use of herbicides in Christmas tree cultivation
- Concern for proper fire line construction and maintenance

Riparian Restoration

The main issues identified by the work group associated with riparian restoration activities are:

- Provide sufficient technical resources
- Provide financial support to riparian restoration
- Need to educate the public to increase awareness of the value of riparian restoration
- Enforce the Virginia Agricultural Stewardship Act

Land Conversion

The main issues identified by the work group associated with riparian restoration activities are:

- Improve watershed planning and use of integrated land use planning methods
- Need better financial incentives to leave forested riparian area in forest use
- Expand public awareness of the societal benefits of forested buffers
- The change in land use from forest to urban or other uses increases nonpoint source pollution loads to surface waters

DEFINITIONS OF FORESTRY ACTIVITIES BY CATEGORY

| FORESTRY ACTIVITY | DEFINITION |
|-------------------------------|---|
| Harvesting | All planning and design, road, log deck and skid trail construction, and maintenance during active logging to remove wood products from the forest to a processing plant. |
| Post-Harvest Site Restoration | All road, deck and skid trail restoration activities, mechanical site preparation, prescribed burning to remove logging debris, and tree planting to facilitate reforestation of the logged site. |
| Maintenance | Maintenance includes upkeep of permanent road and trail systems, prescribed burning for fuel reduction or habitat selection and use of herbicides. |
| Riparian Restoration | Tree planting to restore forest buffers and associated habitat in areas immediately adjacent to streams, rivers and wetlands, to reduce pollution entering streams from adjacent land uses. |
| Land Conversion | Final harvest of the forest with subsequent land-use conversion to agriculture, residential or commercial development, mining or highway construction. |

| FORESTRY CATEGORY | POLLUTANT CATEGORY | | | | | |
|-------------------------------|------------------------|--------------|-----------|---------|----|--------|
| | Total Suspended Solids | Heavy Metals | Nutrients | Thermal | pH | Toxics |
| Harvesting | T | | T | T | | T |
| Post-Harvest Site Restoration | T | | | | | T |
| Maintenance | T | | T | | | T |
| Riparian Restoration | T | | | | | T |
| Land Conversion | T | | T | T | | T |

Existing Forestry Programs

Current program assessment was performed by the Forestry Workgroup following identification of critical issues. Subsequent drafting of objectives and supporting strategies and activities and tasks followed the five categories listed in the previous table.

Harvesting

Department of Forestry

Silvicultural Water Quality Law - *Code of Virginia* Chapter 11 of Title 10.1, article 12 §10.1-1181.1 through 10.1-1181.7

Enacted by the 1993 Virginia General Assembly with support from the forest industry, the Virginia Silvicultural Water Quality Law is the backbone of the forestry NPS pollution program. This law, which is administered through the Virginia Administrative Processes Act, allows a tiered system of inspections, special orders, compliance re-inspections and hearings to prevent NPS pollution. The law addresses sedimentation of streams. Administration of the law allows for stop-work emergency actions, provision of corrective recommendations and civil penalties where warranted.

Another process that improves BMP implementation and encourages compliance with the Silvicultural Water Quality Law, is the DOF Water Quality Complaint System. DOF and industry personnel investigate all water quality complaints involving forestry operations to document the nature of the problem. If a water quality problem can be attributed to silvicultural practices, immediate action is taken to remedy the problem. In the past, DOF has handled 8 to 15 complaints annually with 100 per cent resolution.

Through education and technical assistance programs, DOF has heightened water quality awareness among Virginia's forest industry. These programs, combined with a biannual BMP audit of 60 logged tracts,

inspection of all tracts twice exceeding 10 acres and the Water Quality Complaint System, have improved compliance with the Silvicultural Water Quality Law since its inception in 1993.

BMP inspections performed by DOF personnel represent the core component of the forestry NPS program. Nearly 3,000 BMP inspections are performed annually. During a BMP inspection, timber harvesting activity is compared to acceptable standards as documented in the *Forestry Best Management Practices for Water Quality in Virginia Technical Guide*. Activities, which do not meet the standards set forth in this guide and the more comprehensive *Forestry Best Management Practices Manual*, are identified and timber harvesters are informed in writing of required corrections.

Compliance rates for BMP use has continued to improve since 1989. Moreover, the Streamside Management Zone (SMZ), vital to the maintenance of water quality, continues to be the most well-implemented BMP. To further improve BMP implementation rates, a BMP audit program has been initiated that randomly selects tracts of land for inspection.

Virginia Forest Industries

Since 1988, representative members of Virginia forest industries have participated in the Silvicultural Water Quality Task Force, which advises the state forester on water quality issues. In fact, this group has been chaired throughout its existence by a forest industry representative. The task force includes loggers, forestry consultants, academics and representatives from state environmental agencies. The task force has sponsored and supported innovative logger training, BMP demonstrations, research and legislation to address NPS pollution.

In 1994, the American Forest and Paper Association (AF&PA) developed the Sustainable Forestry Initiative Program, which member forest industries have applied to forest management on industry lands. Approximately 10 per cent of forest land in Virginia is owned by forest industry, the majority by AF&PA members. Each

member company has defined its own plans for implementation of 12 sustainability initiative objectives designed to assure that sustainable forestry is practiced on industry-owned land and to encourage other landowners to do the same. Each member organization conducts performance audits internally, and through third party audits ensure continued high compliance rates with applicable SFI Program objectives. Specifically, Sustainable Forestry Initiative Program objectives three and 10 apply to prevention and reduction of NPS pollution from all forestry operations as outlined in this plan. Objective three addresses water quality protection policy on member companies' land while objective 10 mandates an outreach program to encourage others to adopt the same policy:

SFI Objective 3

"Protect the water quality in streams, lakes, and other water bodies by establishing riparian protection measures based on soil type, terrain, vegetation and other applicable factors, and by using EPA-approved best management practices in all forest management operations."

SFI Objective 10

"Broaden the practice of sustainable forestry by further involving nonindustrial landowners, loggers, consulting foresters and company employees who are active in wood procurement and landowner assistance programs."

A practical outcome of objectives 3 and 10 has been the development of the *SHARP Logger Program* in Virginia, which has core and continuing education courses designed to improve BMP compliance. The program is sponsored by the Virginia Forestry Association (VFA) and features courses developed by faculty at Virginia Polytechnic Institute & State University (VPI&SU). The courses are taught by DOF, forest industry, VFA and university personnel.

USDA Forest Service, George Washington and

Jefferson National Forests

The USDA Forest Service is involved in three national programs concerning management of forest land. The Forest Service administers the national forest system, which in Virginia involves management of 1.6 million acres within the George Washington and Jefferson National Forests. Located in western Virginia, these forests are administered through 10 local ranger district or recreation offices.

Through the State and Private Forestry Program, the forest service provides assistance to state governments concerning management of forest lands not included in the National Forest system. Finally, Forest Service also supports research into innovative management of forest lands. The DCR Karst Groundwater Program and the USFS are currently conducting a joint karst resource inventory of the Forest for use in updating the Forest management plan.

Forest plans for the George Washington and Jefferson National Forests contain standards that are designed to meet or exceed state BMPs for silviculture. These standards are updated as needed to stay in compliance. BMPs are applied to all forestry activities. Project planning includes an environmental assessment to estimate the effects of the project on surface water, as well as, groundwater quality and to determine BMPs needed to protect water quality. Selected BMPs are included as contract provisions for operators on Forest Service projects.

Implementation of BMPs is monitored on all forestry activities. Effectiveness of BMPs is evaluated for a range of forestry activities through water quality monitoring. Biological, chemical and physical water quality parameters are assessed. The Forest Service provides annual summaries of monitoring results to Virginia officials. If monitoring indicates that a BMP is not effective, it is modified and the situation is corrected.

Chesapeake Bay Local Assistance Department

Through its Water Quality Protection Program, the Chesapeake Bay Local Assistance Department (CBLAD) provides assistance to enforce the Virginia

Chesapeake Bay Preservation Act (CBPA – §10.1 - 2100 et seq., *Code of Virginia*) and Chesapeake Bay Preservation Area Designation and Management Regulations (9 VAC 10-20-10). CBLAD provides technical assistance, regulatory interpretations and programmatic guidance to local government officials, landowners, cooperating agencies and all other interested parties regarding the silvicultural criteria of the CBPA regulations and local ordinances.

The Chesapeake Bay Preservation Area Designation and Management Regulations (VR 173-02-01), (or Bay Act regulations), implemented through 84 local governments in the Chesapeake Bay watershed area of the coastal management zone, require all local governments in this area to adopt ordinances to control land use activities and to protect water quality.

Silvicultural operations in CBPAs that do not adhere to the DOF BMP handbook would not be considered silviculture and must comply with the local Chesapeake Bay Act ordinance land use performance criteria and buffer criteria.

CBLAD has estimated that approximately 80 per cent of all lands within tidewater Virginia have been designated as Chesapeake Bay Preservation areas. The Resource Protection Area component of the Bay Act regulations includes all perennial flowing water bodies within tidewater Virginia. Bay Act regulations do not cover the entire region as most local governments did not designate their entire jurisdiction. Preservation areas in these localities were targeted to include land types that could have the most significant impacts on water quality.

Currently, CBLAD distributes funds to tidewater soil and water conservation districts that support employment of agricultural water quality specialists to work with landowners to develop conservation plans and implement BMPs to protect water quality. The plans, called "Soil and Water Quality Conservation Plans," address sediments, nutrients, toxics and pathogens via recommended BMPs and maintenance of mandatory vegetated buffers between agricultural land uses and sensitive environmental features such as streams, rivers, wetlands, bays and swamps. Often these buffers are forested.

Virginia Cooperative Extension

Virginia Cooperative Extension (VCE) and VPI&SU are involved in forest harvesting pollution remediation through DOF in the College of Natural Resources. Such applied research and education efforts target loggers, landowners and local residents throughout the state. From a research information base that has been developed in conjunction with DOF, the USDA Forest Service, the Virginia Forestry Association and Virginia forest industries, VCE provides an ongoing educational program to inform foresters, loggers, landowners, local governments, conservation organizations and citizens of state-of-the-art silvicultural practices.

VCE disseminates research results and current information and tips through its *Newsletter to Virginia Logger*. Educational programs for identified groups regarding logging methods and BMPs to prevent NPS pollution are conducted regularly. Extension agents also conduct bi-annual local bus tours targeted to landowner, citizens, organizations and local governments that cover all aspects of proper forest management.

Department of Conservation and Recreation

Although DCR plays no direct role in managing harvesting activities, DCR does provide funding assistance for DOF program enhancement and implementation. As well, DCR maintains an ongoing nonpoint source pollution assessment process that considers pollution potential associated with harvesting activities. The DCR Karst Groundwater Program and the USFS are currently conducting a joint karst resource inventory of the Forest for use in updating the Forest management plan.

Department of Game and Inland Fisheries

The Department of Game and Inland Fisheries (DGIF) works closely with DOF to assess potential impacts of NPS on endangered and threatened species through the dissemination of biological information by our Online Service and topographical map overlays. Our Fisheries Division also assists in assessing potential impacts to

aquatic resources (e.g. trout).

Post-Harvest Site Restoration

Department of Forestry

Forestry Best Management Practices for Water Quality in Virginia encourages the use of suitable methods of site preparation and forest regeneration. These guidelines recommend mechanical planting on the contour during favorable weather conditions and discourage mechanical site preparation and planting in riparian areas. The handbook describes guidelines for eight site preparation and forest regeneration practices. It also covers wildfire reclamation and encourages the use of prescribed burning practices which protect surface waters from excessive sedimentation. Specific practices for wild fire reclamation include reforestation of bare soil and stabilization of fire lines, eroding gullies, and access roads. BMPs for prescribed burning encourage construction of fire lines along Streamside Management Zones to protect the integrity of these areas. As well, water bars and turnouts are encouraged to disperse runoff and to prevent runoff from being channeled directly into streams.

DOF provides private forest landowners with information on prescribed fire operations. In addition, the department develops and trains private contractors to provide prescribed fire services.

The Silvicultural Water Quality Law (*Code of Virginia*, Section 10.1-1181.1 *et seq.*) is administered by DOF and applies to the entire state. This law makes it unlawful to cause excessive sediment pollution to enter a stream, and it can be used to take corrective actions, levy fines or issue stop-work orders on mechanical site preparation activities which threatens water quality. The Virginia Seed Tree Law §10.1 - 1163, *et seq.* of the *Code of Virginia*, administered by DOF, requires that a preharvest plan be prepared and approved by the state forester or that a forest operation be subject to the

requirement that eight cone-bearing trees with a minimum 14-inch diameter be preserved. This law may also require an alternate management plan to address reforestation for pine tracts harvested in Virginia.

DOF administers several programs that provide financial assistance to stabilize logging roads. These programs include the Reforestation of Timberlands Program, Federal Agricultural Conservation Program and the Forestry Incentive Program. The Reforestation of Timberlands Program will cost-share log road stabilization if the road is within the boundary for the approved Reforestation of Timberlands Program project.

Chesapeake Bay Local Assistance Department

Silvicultural operations in Chesapeake Bay Preservation Areas that do not adhere to DOF BMP handbook must comply with the local CBPA ordinance requirements. Local ordinances require a 100-foot wide vegetative buffer area along all tidal wetlands, tidal shores, tributary streams and nontidal wetlands connected by surface flow and contiguous to the other features (Resource Protection Areas). Site preparation activities are prohibited in the SMZ. If site preparation occurs in the SMZ it would be considered a CBPA buffer area violation and revegetation of the full 100-foot wide CBPA buffer area and any associated wetland would be required.

USDA Forest Service George Washington and Jefferson National Forests

Forest plan standards include use of BMPs in all site preparation and reforestation activities that must meet or exceed state BMP standards. Standards of management during logging and restoration and closure of forest roads, skid trails and log decks are stipulated in all contracts with loggers and reforestation contractors. The Forest Service is developing a national policy that will provide for road closing and obliteration of unnecessary roads. Once developed, this policy will be in effect on all Virginia national forest lands.

In addition to the applicable state programs, the George

Washington and Jefferson National Forest staff meet annually with their timber purchasers and contractors for training, information exchange and clarification of road specifications.

Staff require the logging contractors to maintain temporary roads in compliance with the Forest Service road operation specifications. These requirements are administered through timber harvest contracts. The George Washington and Jefferson National Forest often uses roads constructed as a result of timber harvest for continued access for recreation, wildlife management, hunting, fishing and forest management throughout the life of the next stand of timber. Roads are maintained to strict standards and specifications outlined in USDA Forest Service manuals. The George Washington and Jefferson National Forest staff meet annually with loggers and contractors for training, information exchange and clarification of road specifications, including maintenance. Within the George Washington and Jefferson National Forest, revegetation of disturbed areas is required of all silvicultural operations in accordance with Forest Service policies.

Forest Industry

The Sustainable Forestry Initiative Program addresses site preparation and reforestation through the following objective:

Promptly reforest harvested areas to ensure long-term forest productivity and conservation of forest resources.

AF&PA members must report annually to the national office any acres not regenerated within two years of harvest.

USDA Natural Resource Conservation Service

The USDA Natural Resource Conservation Service (NRCS) and its sister agency, the Farm Services Agency (FSA) support site preparation and reforestation through several cost-share programs that require conservation plans that include BMPs to protect surface waters. In addition, the NRCS operates Conservation Plant Material Centers where research and

demonstrations are conducted to provide adaptive, native plants for restoration purposes.

NRCS and FSA administer several programs that provide cost-share assistance for reforestation and conservation practices. These programs require a conservation plan that includes BMPs for all site preparation and reforestation practices. Available programs include the Environmental Incentives program (EQIP), Conservation Planning Technical Assistance (CTA), Conservation Reserve Program (CRP), Forestry Incentive Program (FIP) and Small Watershed program (PL566).

Department of Conservation and Recreation

The Department of Conservation and Recreation (DCR) supported development, printing and distribution of the *Forestry Best Management Practices for Water Quality in Virginia Technical Guide* through funding and technical support. The department also manages the Virginia Agricultural BMP Cost-Share Program, administered through soil and water conservation districts, that provides assistance to landowners for log road stabilization practices such as grading and vegetative stabilization.

Forest Maintenance

Department of Forestry

The *Forestry Best Management Practices for Water Quality in Virginia* handbook provides guidelines for road and trail maintenance following reforestation activities where continued access to the property is necessary.

The handbook encourages proper planning and application of pesticides to protect surface waters. BMPs emphasize spraying techniques to prevent direct application or drift of pesticides to surface waters, wetlands and other environmentally sensitive resources. As well, it recommends strict adherence to label directions for application of chemicals and disposal of containers. Persons who apply chemicals are specifically encouraged to consider proximity to surface waters.

DOF administers an aerial spraying program which is used for site preparation and to manage competition between softwoods, hardwoods, and herbaceous vegetation on young pine plantations. DOF staff manage contracts with persons who perform aerial spraying and are trained and certified in commercial application of pesticides. This training helps ensure that pesticide application is conducted in a manner which minimizes impacts to surface waters.

Virginia Department of Agriculture and Consumer Services

The Virginia Pesticide Control Act (Sec. 3.1-249.27, *et seq.* of the *Code of Virginia*) and the regulations promulgated under its authority have the effect of implementing in Virginia the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) as well as providing to the Virginia Pesticide Control Board (Board) additional powers relating to regulating pesticide use. Under the authority of the act and FIFRA, the board has promulgated regulations establishing certain mandatory programs, including Pesticide Applicator Certification and Pesticide Business Licensing, as well as establishing voluntary programs such as the Pesticide Disposal Program and the Pesticide Container Recycling Program. Under the authority of FIFRA and in agreement with EPA, the board's staff will enforce the Worker Protection Standard and develop pesticide management plans for groundwater when required. Collectively, these programs regulate how pesticides will be used in the state by enforcing the federal label requirements and Worker Protection Standard, and requiring training and licensing of individuals and businesses that apply pesticides. In addition, the Certification and Licensing Programs assure that pesticide users will have appropriate training, provided in cooperation with Virginia Cooperative Extension (VCE) on the principals and practice of Integrated Pest Management.

Virginia regulations require that application equipment be in good working order and properly calibrated. Furthermore, these regulations require the use of backflow preventers to protect water supply systems, lakes or other sources of water. Violation of these regulations triggers enforcement under the authority of the act.

Violations of the Virginia Pesticide Control Act can result in revocation or suspension of licenses and/or assessment of penalties. Enforcement is administered through 10 regional offices with investigation staffs. Unannounced, random field inspections of pesticide applications are used to enforce the Virginia Pesticide Control Act.

USDA Forest Service George Washington and Jefferson National Forest

Forest plan standards include the use of BMPs in all herbicide application practices. These standards must meet or exceed state BMP standards and such standards are stipulated in all contracts. The Forest Service is developing a national road policy that will provide for improved maintenance standards of all designated permanent roads within the national forest system. Once developed, the policy will apply to all roads on the George Washington and Jefferson National Forests.

Riparian Buffers

Department of Forestry

The Department of Forestry led the governor's effort to develop the *Commonwealth of Virginia Riparian Buffer Implementation Plan*. DOF provides staff support to the Virginia Riparian Buffer Work Group, which is charged with implementing the plan. The plan outlines six objectives and subsequent strategies to support Virginia's commitment to restore 610 miles of riparian forested buffers within the Chesapeake Bay watershed. In addition, at least 300 additional miles of restoration are sought in the state's Southern Rivers Watershed.

Commonwealth of Virginia Riparian Buffer Implementation Plan Objectives:

- Restore missing or inadequate buffers;
- Conserve existing riparian buffers;

- Enhance program coordination and accountability;
- Enhance incentives;
- Promote education and outreach; and
- Target, conduct and track research.

A multi-agency Riparian Buffer Work Group, appointed by the Secretary of Natural Resources is responsible for implementation of set strategies to achieve the plan's objectives.

Department of Conservation and Recreation

As Virginia's lead nonpoint source pollution agency, DCR plays a central role in riparian buffer protection, establishment, and restoration. Specifically, DCR provides financial and technical support for buffer area establishment and streambank and shoreline restoration.

DCR's Virginia Agricultural BMP Cost-Share Program and the Conservation Reserve Enhancement Program (CREP) support landowner installation of riparian buffers. In addition, the department sponsored a series of introductory and advanced riparian restoration and stream stability workshops throughout the Commonwealth from 1995 through 1998. Technical recommendations on streambank restoration on non-tidal and tidal waters is available from department engineers.

The Conservation Reserve Enhancement Program (CREP) is a cooperative effort between the Commonwealth of Virginia and the United States Department of Agriculture to enhance the water quality and the fisheries and wildlife habitat within two targeted watersheds; the Chesapeake Bay and the Southern Rivers Watershed which is outside the bay area of Virginia. The overall goal of the program is to implement water quality improvement practices on 35,000 acres within Virginia.

Chesapeake Bay Local Assistance Department

The Chesapeake Bay Preservation Area (CBPA)

Designation and Management Regulations (VR 173-02-01), implemented through 84 local governments in the Chesapeake Bay watershed area of the coastal management zone, require all local governments in this area to adopt ordinances to control land use activities and to protect water quality.

CBLAD has estimated that approximately 80 per cent of all lands within Tidewater, Virginia have been designated as CBPA. The Resource Protection Area component of CBPAs includes all perennial flowing water bodies within tidewater Virginia. CBPAs do not cover the entire region as most local governments did not designate their entire jurisdiction.

Currently, CBLAD distributes funds to soil and water conservation districts in Tidewater Virginia that support employment of agricultural water quality specialists to work with landowners to develop conservation plans and implement BMPs to protect water quality. The plans, called "Soil and Water Quality Conservation Plans" address sediments, nutrients, toxics and pathogens via recommended BMPs and maintenance of mandatory vegetated buffers between agricultural land uses and sensitive environmental features such as streams, rivers, wetlands, bays and swamps. Often, these buffers are forested.

USDA Forest Service George Washington and Jefferson National Forest

The Forest Service has participated in the Chesapeake Bay Program's riparian buffer efforts. Opportunities for riparian buffer reforestation on Virginia national forests have been inventoried and riparian forest buffers are being established as resources and funding allow.

George Washington and Jefferson National Forest designates all streamside areas and wetlands for special management considerations under a "Streamside Area Management" policy. To protect streamside zones, the George Washington and Jefferson National Forest staff designate all riparian management areas in management plans and timber sale contracts. Sales contracts are used to specify conditions of logging operations in streamside management areas.

USDA Natural Resource Conservation Service (NRCS)

NRCS and the Farm Services Agency have been encouraging riparian buffer restoration since 1995 through Food Security Act cost-share programs. Currently, the Conservation Reserve Program (CRP) enables landowners to receive cost-share payments for establishment of grass and riparian buffers on highly erodible agricultural lands. Landowners also receive a rental payment for a contracted period of time.

During 1998, NRCS partnered with the DCR to develop the Conservation Reserve Enhancement Program which mirrors CRP but focuses only on establishment of forest or grass buffers and wetland restoration. In addition, cost-share and rental payments will be supplemented through state funds, and an easement option entirely supported through the Water Quality Improvement Fund is available for designation of permanent conservation easements. The program, administered by NRCS and DCR through an advisory committee of conservation federal and state agencies as well as conservation organizations, will be available to landowners from mid-1999 through 2004.

Conservation Organizations

Conservation organizations such as the Chesapeake Bay Foundation, Trout Unlimited, Inc. and Ducks Unlimited, Inc., along with the Izaak Walton League of America and river organizations, have sponsored local riparian restoration demonstration projects, restoration seminars and conservation easements.

Forest Industry

The Sustainable Forestry Initiative Program addresses riparian protection and restoration and reforestation through the following objectives:

SFI Objective 3

“Protect the water quality in streams, lakes, and other water bodies by establishing riparian protection measures based on soil type, terrain, vegetation and other applicable factors, and by using EPA-approved

best management practices in all forest management operations.”

SFI Objective 11

Enhance the quality of wildlife habitat by developing and implementing measures that promote habitat diversity and the conservation of plant material and animal populations found in forest communities.

Department of Game and Inland Fisheries

The DGIF Forest Stewardship program assists landowners in riparian restoration, and the Nongame Wildlife Program provides technical assistance for stream restoration projects via Partners for Wildlife.

Land Conversion from Forest to Other Uses

Virginia Department of Taxation

The Virginia Department of Taxation administers the Virginia Land-use Assessment Law (Sec. 58.1-3229 *et seq.* of the *Code of Virginia*) which enables local governments to adopt a land-use taxation option. This provides a reduction in property tax for participating landowners. A forest management plan, including a harvest plan, is required for the landowner to receive this tax reduction. This program is overseen by the State Land-use Evaluation Advisory Council, and is administered by local governments. This tax incentive encourages sustainability of the forest resource.

Local Governments

Local governments not only can authorize use value taxation for forested areas, but can extend the option to riparian area and wetlands protection. This option was provided by the Virginia General Assembly during 1997 through amendment of §58.1-3230 of *The Code of Virginia* through introduction of §58.1-3665. The 1998 General Assembly added a provision for restoration of

local tax revenues from the Virginia Water Quality Improvement Fund.

Forest Industry

The Sustainable Forestry Initiative Program considers maintenance of the forest land base through objectives six and 12:

Manage company lands of ecologic, geologic or historical significance in a manner that accounts for their special qualities.

Provide opportunities for the public and the forestry community to participate in the AF&PA membership's commitment to sustainable forestry.

By reserving "special places" on industry lands, and encouraging others in stewardship, forest industry is acting to preserve Virginia's natural and historic heritage.

OBJECTIVES

(SHORT-TERM GOALS)

Five objectives were developed by the state's Forestry Workgroup to address the NPS pollutant categories and the critical issues that were subsequently identified. Objectives were developed to address critical issues and are targeted to those activities not subject to current water quality and wetland permit requirements and regulations. This approach considered and addressed all potential NPS pollution and riparian habitat considerations.

Objective 1. Reduce nonpoint source pollution from all harvesting activities throughout Virginia to maintain acceptable water quality and habitat

Objective 2. Ensure prompt reforestation and site stabilization using all applicable BMPs following harvest

Objective 3. Apply state-of-the-art BMPs to maintained forest roads and maintain applicable standards and procedures in the use of pesticides and fire used in silvicultural operations

Objective 4. Support Chesapeake Bay Program Riparian Forest Buffer Directive through the establishment of at least 610 miles of riparian forest buffer by 2010 within the bay watershed and target riparian restoration throughout Virginia's river corridors

Objective 5. Foster local partnerships, ordinances and innovative strategies to conserve forest lands critical to water resources, wildlife habitat, sustainable forest industries and local communities

TABLES OF OBJECTIVES & STRATEGIES

The objectives, strategies and related tasks presented in this section reflect a five-year planning cycle (through 2005). The objectives were formed following a detailed listing of critical forestry NPS pollution issues and subsequent analysis of current programs. Emphasis in developing the five-year plan was on continuing crucial ongoing activities that will be evaluated annually. Some activities by their very nature are "ongoing" and will continue indefinitely. These ongoing activities are presumed to be supported through maintenance of current funding levels.

In addition, related tasks to address critical forestry NPS pollution issues have been included. Some of these new activities can be accomplished through the support of the forestry community without specific new funding sources. Others will require new funding through the §319 program, the Silvicultural Water Quality Law Enforcement Fund or other funding sources. (For additional strategies, objectives, and tasks regarding implementation of forestry management measures in the coastal zone refer to Chapter XIII Coastal Nonpoint Source Pollution Control Program.)

Harvesting

| OBJECTIVE 1 | | | | |
|---|---|---|-------------|---|
| <i>Reduce nonpoint source pollution from all harvesting activities throughout Virginia to maintain acceptable water quality and habitat</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCE |
| 1.1 Refine pre-harvest planning procedures to increase landowner and logger participation | Evaluate US Forest Service pre-harvest planning procedures as to technical applicability to pre-harvest planning on private lands | •DOF & •VCE with •George Washington & Jefferson National Forest staff | 2001 | •Current levels adequate |
| | Explore technical transfer mechanisms, training and demonstrations | | | |
| | AF&PA forest industries will accept roundwood (primary) delivered only by <i>SHARP Loggers</i> | •Member AF&PA Virginia forest industries | 2001 | •Industry funding adequate |
| | Develop strategy for <u>all</u> wood (primary & secondary) to be delivered to AF&PA industries through <i>SHARP Loggers</i> program | •Member AF&PA Virginia forest industries | 2002 | •Industry funding adequate |
| | Develop sediment delivery estimate protocol as component of preharvest planning for sensitive sites | •USFS •DOF •DCR-Div. Of Natural Heritage | 2002 | •Additional funding required, will target \$319 |
| | Develop and implement a pre-harvest plan for landowners to qualify for reforestation cost-share funds | •DOF | 2003 | •Current levels of funding adequate |

| OBJECTIVE 1 | | | | |
|---|---|--|-------------|----------------------------|
| <i>Reduce nonpoint source pollution from all harvesting activities throughout Virginia to maintain acceptable water quality and habitat</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCE |
| 1.1 (Cont.) Refine pre-harvest planning procedures to increase landowner and logger participation | Develop an expanded pre-harvest planning course as a continuing education option in the Sharp Logger Program | •Forest Industry •VCE •DOF •VFA | 2001 | •Industry funding adequate |
| 1.2. Evaluate and amend if necessary the Silvicultural Water Quality Law to streamline enforcement procedures | Assign evaluation of enforcement process to a sub-committee of the Silvicultural Water Quality Task Force | •Silvicultural WQTF | 2000-2001 | •Current funding adequate |
| | Introduce applicable legislation to amend Silvicultural Water Quality Law | •Silvicultural WQTF | 2001 | •Current funding adequate |
| 1.3 Maintain state-of-the-art logger training program | Evaluate current training program effectiveness using a logger focus group | •VCE •DOF •Forest industry •VFA Logger's Council | 2000-2001 | •Current funding adequate |
| | Provide technical support to loggers and landowners through refined training program, newsletters and on-site consultations | •DOF •VCE •VFA Logger's Council | Ongoing | •Industry funding adequate |
| | Ensure continued availability of <i>SHARP Logger</i> training program to all interested loggers and foresters | •DOF •Forest Industry •VCE | Ongoing | •Industry funding adequate |

| OBJECTIVE 1 | | | | |
|---|---|--|-------------|---|
| <i>Reduce nonpoint source pollution from all harvesting activities throughout Virginia to maintain acceptable water quality and habitat</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCE |
| 1.3 (Cont.) Maintain state-of-the-art logger training program | Continue <i>Mountain Logging Symposium</i> annually to focus on critical area and steep site logging BMP methods | •VCE •DOF | Annually | •Current funding through Silvicultural Water Quality Law Enforcement Fund |
| | Provide intensive preharvest planning, hydrology and civil engineering training and support to DOF Water Resources Team | •DOF | Annually | •\$10,000 annually through 2005 through General Fund or SWQLE Fund |
| 1.4 Support alternative logging methods to reduce NPS pollution impacts on water resources | Demonstrate cable logging, helicopter systems and other low impact systems applicable to mountain terrain | •DOF •VCE •USFS | Continuous | •Cooperative funding through USFS |
| | Demonstrate low impact logging methods for use in wet season logging in the Coastal Plain and on other sensitive sites | •DOF •DCR •VCE •CBF •Forest Industry | •Continuous | •Current Silvicultural Water Quality Law Enforcement Fund |
| | Develop adaptive BMPs to protect tier III waters and sensitive wildlife habitats | •DOF •USFS •DCR Div. Natural Heritage | 2001 | •Current funding levels adequate |

Post-harvest Site Restoration

| OBJECTIVE 2 | | | | |
|--|---|---|-------------|----------------------------------|
| Ensure prompt reforestation and site stabilization using all applicable BMPs following harvest | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 2.1 Continue Silvicultural Water Quality Law enforcement timing through the final inspection process to minimize water quality degradation | Continue 24-hour response to complaints and toll-free hotline | •DOF | Ongoing | •Current funding levels adequate |
| | Use DOF three standard criteria for automatic enforcement action through final inspection process | •DOF | Annually | •Current funding adequate |
| | Continue bi-annual compliance audits to assess BMP effectiveness and Silvicultural Water Quality Law compliance. (60 tracts annually) | •DOF •VCE •Forest Industry •Consulting Foresters | Annually | •Current funding adequate |
| | Use bi-annual audits to refine and target training emphasis each year | •DOF •VCE •VFA | Annually | •Current funding adequate |

| OBJECTIVE 2 | | | | |
|---|---|---|-------------|--|
| <i>Ensure prompt reforestation and site stabilization using all applicable BMPs following harvest</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 2.2. Continue emphasis of AF&PA Sustainable Forestry Initiative Program Objective 10 | Increase landowner short course offerings and participation through program evaluation and marketing | •VFA •VCE | 2001 | •Additional funding necessary through forest industry, 319 or SWQLE Fund |
| | Develop cooperative sub-committee of the Silvicultural Water Quality Task Force to mutually assess forest industry and DOF compliance audits to promote improvement of BMP implementation | •AF&PA Forest Industry •VCE •WQTF | 2001 | •Current funding adequate |

Forest Maintenance

| OBJECTIVE 3 | | | | |
|--|--|--|-------------|--|
| Apply state-of-the art Best Management Practices to maintained forest roads and maintain applicable standards and procedures in the use of pesticides and fire used in silvicultural operations. | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 3.1 Examine US Forest Service road retirement policy and make applicable recommendations for use on private and industrial forest lands in Virginia | Assign sub-committee of Silvicultural Water Quality Task Force to accomplish this objective | •USFS Silvicultural Water Quality Task Force | 2001 | •Current funding adequate |
| | Establish demonstration areas and incorporate new recommendations into <i>SHARP Logger</i> training | •Forest Industry •DOF •VFA Logger's Council | 2002 - 2004 | •Additional 319 funding necessary - \$10,000 per new demonstration |
| 3.2.Maintain applicable standards and procedures for use of herbicides | Through the Virginia Christmas Tree Growers Association, provide training, fact sheets and herbicide applicator information | •VCE •VA Christmas Tree Grower's Assoc. •VDACS | 2001 | |
| | Maintain stringent DOF herbicide application program through annual contracts, training, and pesticide applicator certification for DOF nursery and contracted aerial program (site prep and aerial release) | •DOF •VDACS •Forest Industry | Annually | •Current funding adequate |

| OBJECTIVE 3 | | | | |
|---|---|--|------------------------------|--|
| <i>Apply state-of-the art Best Management Practices to maintained forest roads and maintain applicable standards and procedures in the use of pesticides and fire used in silvicultural operations.</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 3.3. Improve DOF prescribed burning protocols to ensure public safety and reduce impacts to water quality | Appoint task force to refine prescribed burning procedures | •DOF •DCR, Natural Heritage •Forest Industry | 2001 | •Current funding adequate |
| | Provide training to certify all prescribed burning agency, industry and consulting staffs | •DOF | 2002-2004 ongoing thereafter | •Current funding adequate |
| 3.4 Continue efforts to prevent petroleum product spills on log decks, helicopter landings and prescribed burning sites | Pursue MOA between DOF and DEQ to address spillage prevention and mitigation | •DOF •DEQ | 2001 | •Current funding adequate |
| | Incorporate preventive and mitigative measures into <i>SHARP Logger</i> , agency and consultants training | •DOF •DEQ •VFA •DGIF | 2002 | •\$5000 for new training module through 319, SWQLE Fund, forest industry |
| | Develop adaptive BMPs to protect tier III waters and sensitive aquatic habitats | •DOF •WQTF •USFS •DEQ •DCR Div. Natural Heritage | 2002 | •\$15,000 new funding; 319, USFS |

Riparian Restoration

| OBJECTIVE 4 | | | | |
|---|---|--|-------------|--|
| Support Chesapeake Bay Program Riparian Forest Buffer Directive through the establishment of at least 610 miles of riparian forest buffer by 2010 within the bay watershed and target riparian restoration throughout Virginia's river corridors. | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 4.1 Provide public education to increase awareness of the value of riparian restoration | Initiate major public relations campaign with American Forestry Association | •DOF •DCR •DGIF •American Forestry Assoc. | 2001 | •American Forestry Assoc. partnership |
| | Promote riparian restoration in watershed restoration action strategies developed for Virginia watersheds | •DOF/ •DCR •VA SWCD •DGIF | 2001 | •Current levels adequate |
| | Increase demonstration areas in each Virginia watershed | •DOF •DGIF | 2001 | •\$50,000 through Bay NPS Implementation Program, CZARA, 319 |

| OBJECTIVE 4 | | | | |
|---|--|--|-----------------------|---|
| Support Chesapeake Bay Program Riparian Forest Buffer Directive through the establishment of at least 610 miles of riparian forest buffer by 2010 within the bay watershed and target riparian restoration throughout Virginia's river corridors. | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| | Develop short-course in riparian values and restoration within landowner short course series | <ul style="list-style-type: none"> •VFA •VCE •DGIF | 2002 | <ul style="list-style-type: none"> •Current levels adequate for technical support, \$10,000 for training materials through CZARA, Bay NPS Implementation Program |
| 4.2 Allocate resources to meet riparian restoration targeted goals | Finalize and implement CREP MOU | <ul style="list-style-type: none"> •DCR •DGIF •Farm Services Agency | 1999 | •CREP |
| | Assure funding for CREP, Virginia Agricultural BMP Cost-Share Program and other state cost-share and grant programs | <ul style="list-style-type: none"> •DCR •DOF •NRCS •FSA •DGIF | Annually through 2004 | •WQIF |
| | Provide restoration and marketing training to natural resource professionals to implement Conservation Reserve Enhancement Program and other restoration initiatives | <ul style="list-style-type: none"> •DCR •DOF •DGIF •NRCS •CBF •Ducks Unlimited | Annually through 2005 | •CREP |

| OBJECTIVE 4 | | | | |
|---|--|--|----------------------|---|
| Support Chesapeake Bay Program Riparian Forest Buffer Directive through the establishment of at least 610 miles of riparian forest buffer by 2010 within the bay watershed and target riparian restoration throughout Virginia's river corridors. | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| | Provide continued technical support to challenging restoration projects through interdisciplinary agency support (hydrology, soils, civil engineering) | <ul style="list-style-type: none"> •DOF Water Resources Team •DCR •DGIF •Virginia Riparian Buffer Work Group •Consulting engineers •Conservation agencies & orgs | Ongoing through 2005 | <ul style="list-style-type: none"> •Maintenance of technical staff support is required. Some increase in technical staff may be necessary. |
| 4.3 Enforce the Virginia Agricultural Stewardship Act and Chesapeake Bay Preservation Area Designation and Management Regulations local ordinances (Bay Act regulations) | Provide consistent enforcement across soil and water conservation districts of the Virginia Agricultural Stewardship Act to promote the use of riparian buffers on farms to mitigate sediment and nutrient NPS pollution | <ul style="list-style-type: none"> •VDACS •SWCDs •CBLAD •DGIF | Ongoing | <ul style="list-style-type: none"> •Current funding levels |
| | Continue consistent use of Chesapeake Bay Preservation Areas and Chesapeake Bay Management Areas in all coastal localities to protect riparian buffers | <ul style="list-style-type: none"> •CBLAD •Tide-water localities | Ongoing | <ul style="list-style-type: none"> •Current funding levels |

Land Conversion

| OBJECTIVE 5 | | | | |
|---|--|--|-------------|--|
| Foster local partnerships, ordinances and innovative strategies to conserve forest lands critical to water resources, wildlife habitat, sustainable forest industries and local communities | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 5.1 Expand incentives to landowners electing to maintain riparian areas in forest use | Encourage localities to adopt the riparian buffer local land use taxation option | <ul style="list-style-type: none"> •DOF •DCR •Conser- vation Organiza- tions •Virginia Outdoors Found. | Ongoing | <ul style="list-style-type: none"> •WQIF may re- imburse localities for lost revenues |

| OBJECTIVE 5 | | | | |
|---|--|--|--------------|---|
| Foster local partnerships, ordinances and innovative strategies to conserve forest lands critical to water resources, wildlife habitat, sustainable forest industries and local communities | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| | Fully implement Conservation Reserve Enhancement Program (CREP) conservation easement option and other conservation easement programs | •DCR •DOF •NRCS •Virginia Outdoors Found. | Through 2004 | •CREP •General Fund •Increased private funds |
| | Implement "enhance incentives" objective of the Commonwealth of Virginia Riparian Buffer Implementation Plan | •Virginia Riparian Buffer Work Group | Through 2010 | |
| 5.2. Seek maintenance of a sustainable forest resource through partnerships with local governments, business and communities | Explore governmental incentives for industrial stewardship | •Virginia Urban Forestry Council •VA Municipal League •VA Assoc. of Counties | Through 2005 | |
| | Promote the economic and environmental benefits of Green Building practices and Sustainable Community Design | •Virginia Urban Forestry Council | Ongoing | |
| 5.2 (Cont.) Seek maintenance of a sustainable forest resource through partnerships with local governments, business and communities | Support and conduct conference on forest protection, sustainability and innovative growth policies targeted to localities, developers, conservation organizations and community groups | •Virginia Urban Forestry Council | 2002 | •Conference registration fees and sponsorships |

| OBJECTIVE 5 | | | | |
|---|--|--|-------------|---|
| Foster local partnerships, ordinances and innovative strategies to conserve forest lands critical to water resources, wildlife habitat, sustainable forest industries and local communities | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 5.3 Reduce impact of land clearing for development, agriculture, mining and transportation | Create workgroup of urban development, forestry and agriculture interests to develop and promote the use of BMPs in land clearing activities involving permanent land-use change | •DOF •DCR •CBLAD •NRCS | 2004 | •Current funding adequate |
| | Fully use authorities of Chesapeake Bay Preservation Area ordinances, conservation easements and other techniques to maintain forests adjacent to streams, rivers, wetlands and sensitive habitats | •DOF •DCR •CBLAD •Local governments | Ongoing | •Current funding levels adequate |
| | Develop guidelines for communities to maintain sustainable forest resources for water quality. Distribute and promote. | •DOF •DCR •DEQ •Local governments | 2004 | •Additional \$50,000 319, bay, CZARA to produce, print and distribute |
| | Promote the economic and environmental benefits of the Powell River Project's research on reforestation and forest land uses of surface mined lands | •VPI&SU | Ongoing | •Increase current funding by \$10,000 - \$25,000 annually |

WORK GROUP MEMBERS & AGENCY/ORGANIZATION REPRESENTED



Forestry

Department of Conservation & Recreation Facilitator:

Ms. Deborah Mills

Nonpoint Source Program Manager:

Mr. Rick Hill

Mr. Harry Augustine
Department Of Environmental Quality

Mr. Wayne Barfield
Westvaco Appalachian Woodlands

Mr. Tom Davenport
Cherokee Forest Voices

Mr. Mike Foreman
Department of Forestry

Dr. Greg Garman
Virginia Commonwealth University

Mr. Jay Gentry
Virginia Council Trout Unlimited

Mr. Jay Gilliam
Izaak Walton League of America/Save Our Streams

Mr. Samuel Hamilton
Virginia Agribusiness Council

Mr. Kirk Havens
Virginia Institute of Marine Science

Mr. Paul Howe
Virginia Forestry Association

Ms. Ann Jennings
Chesapeake Bay Foundation

Mr. Munroe Jones
Union Camp Corporation

Ms. Ginger Kopp
Natural Resources Conservation Service

Mr. Rick Parrish
Southern Environmental Law Center

Mr. Richard Patton
U.S. Forest Service

Ms. Sarah Pugh
Virginia Department of Agriculture & Consumer Services

Mrs. Donna Pugh-Johnson
Virginia Agribusiness Council

Mr. Bob Radspinner
Resource Forester-Environmental Georgia Pacific

Mr. Willy Reay
Virginia Institute of Marine Science

Mr. Tom Reeder, Jr.
The Glatfelter Pulp Wood Co.

Dr. Gerry Rozan

Mr. Bill Saunders
Department of Forestry

Mr. David Sausville, Jr.
Ducks Unlimited, Inc.

Dr. Robert Shaffer
Virginia Polytechnic Institute & State University

Mr. Mark Slauter
Department Of Conservation & Recreation

Mr. Wilmer Stoneman
Virginia Farm Bureau Federation

Mr. Hugo Valverde
Hampton Roads Planning District Commission

Mr. Charlie Wade
Shenandoah Watershed Manager

Mr. Ron Wood
Chesapeake Bay Local Assistance Department

CONSTRUCTION AND DEVELOPMENT



LONG-TERM GOAL (15- YEAR)

The goal of Virginia's construction and development related nonpoint source pollution programs is to continually evaluate and improve the implementation of existing laws, regulations and conservation engineering practices, developed to provide the framework for comprehensive environmental protection and preservation of the economic integrity of both on-site and off-site properties and resources. Increases in construction and development activities, as well as an increased awareness of both the environmental and economic impacts of those activities, has resulted in the need for more effective implementation of the current laws, regulations and practices. Effective implementation of construction and development related nonpoint source pollution programs has been clearly identified as a statewide priority for these programs. The following three broadly stated goals summarize implementation strategies presented within this chapter.

1. Expand and increase educational efforts to all citizens of the commonwealth including state and local government personnel, concerned citizens, property owners, developers, consultants, and contractors
2. Expand and increase educational materials and programs to include construction and development related data which correlate a clear relationship between stewardship of the environment and the economic vitality of Virginia's land and water resources
3. Improve the efficiency, the effectiveness and the equitable execution of current laws and regulations

INTRODUCTION

The conversion of land surface from undeveloped open and woodland space to an urbanized setting complete with housing, commercial and transportation infrastructure, causes a significant change in the surface runoff hydrology and eliminates opportunities for infiltration and flow attenuation. This developed condition increases the volume and peak flow rate of runoff from rainfall. During the construction process excess runoff can become laden with sediment and nutrients, which are then deposited in downstream channels, sinkholes and streams. The post-construction, or developed condition increase in runoff can cause severe accelerated erosion of stream channel beds and banks, depositing additional sediment and nutrients in the downstream systems, as well as destroying the various habitats found within the stream channel. The urbanized landscape also collects and stores various urban pollutants such as sediments, nutrients and toxics on impervious surfaces. During storm events these deposited pollutants are quickly and easily flushed from impervious surfaces resulting in potentially high concentrations of pollutant laden runoff. Finally, the urbanizing landscape typically contains an increasing number of privately owned on-site sewage disposal systems which, over time, may release pathogens to the surface runoff.

Certification Regulations are administered under the authority of the Virginia Soil and Water Conservation Board. The law requires that every county, city and incorporated town adopt a local ESC ordinance or program consistent with the regulations. Further, the local government personnel must become certified through the DCR Erosion and Sediment Control Certification program. Additionally, DCR is the state's ESC chief program administrator and plan approving authority for state agencies participating in regulated land-disturbing activities as well as utility and rail companies that submit annual specifications to the DCR. The law requires that state agencies responsible for land-disturbing activity ensure compliance with the approved plan or specifications.

Stormwater Management Program: The DCR also administers the Virginia Stormwater Management Law (SWM) and regulations. The law enables every county, city and incorporated town to adopt a local SWM ordinance or program consistent with the regulations. Additionally, DCR functions as the state's SWM chief program administrator and plan approving authority for state agencies participating in regulated land-disturbing activities. The law requires that state agencies responsible for land-disturbing activity ensure compliance with the approved plan or specifications.

Both the SWM and ESC programs contain the same four components. These four components are administration, project inspection, plan submittal - review - approval, and enforcement. While DCR has the ultimate responsibility for assuring equitable, efficient and effective enforcement of both the ESC and SWM programs, each law delegates implementation responsibilities to three distinctly different jurisdictional entities: (1) locally adopted ESC or SWM programs, (2) state agencies, and (3) utility and rail companies. These jurisdictional separations are designed to develop systems of accountability for ensuring compliance with both the ESC and SWM laws while taking into account the vastly different construction practices and environmental complexities that are specific to each. Locally adopted programs implement all four components while DCR implements the plan (and annual

AGENCY ROLES & RESPONSIBILITIES

Virginia Department of Conservation and Recreation

The Department of Conservation and Recreation (DCR) is the lead agency in implementing Virginia's management plan for nonpoint source pollution (NPS) control, and as such, administers the following programs for construction and development related activities:

Erosion and Sediment Control Program: The Virginia Erosion and Sediment Control (ESC) Law and Regulations, and the Erosion and Sediment Control

plan and specifications) review - approval process and all enforcement responsibilities for state agencies and utility and rail companies. Hence, DCR's primary role in successful statewide implementation of these programs is to ensure that these three separate entities are effective and consistent in their implementation of the state's regulations and minimum standards, and that equitable enforcement measures are applied.

Floodplain Management Program: DCR administers the Virginia Flood Hazard Reduction Act. The Floodplain Management staff provides leadership, training and technical assistance to local governments in the implementation of the National Flood Insurance Program (NFIP) and the Community Rating System (CRS). In addition DCR staff assists in the development and implementation of Flood Hazard Mitigation Plans.

Shoreline Erosion Advisory Service: DCR implements the Virginia Shoreline Erosion Advisory Service (SEAS). This program, enacted in 1980, promotes environmentally acceptable shoreline and riverbank erosion measures to protect property and reduce sediment and nutrient loads to the Chesapeake Bay and other waters of the commonwealth. The primary function of the SEAS program is providing technical advice to prevent and correct shoreline erosion problems to landowners, local governments and environmental agencies.

DCR sponsors the Karst Groundwater Program in a 33-county region underlain by cavernous and/or mined-out bedrock. This mountainous area is rich in natural biodiversity, and drains into the headwaters of many of our major river basins. The karst program offers technical and grant-writing assistance to individuals, community and school groups, soil and water conservation districts, and businesses in western Virginia. Projects involve surface and groundwater monitoring, biological inventories, public education, conservation planning, and BMP implementation. By working through the State Environmental Review Process (SERP), DCR reviews and comments on major construction projects proposed near Natural Area Preserves, caves, and other conservation sites. Information about the collapse and subsidence history of karst areas is provided, if known, and technical assistance with site-specific karst issues offered

The Department of Environmental Quality

Environmental Impact Review: The Department of Environmental Quality (DEQ) Office of Environmental Impact Review coordinates the state's responses to environmental documents for proposed state and federal projects. The environmental impact review staff distributes documents to appropriate state agencies, planning districts and localities for their review and comment. Upon consideration of all comments, the staff prepares a single state response which typically identifies various programs and regulations which require compliance.

Virginia Pollution Discharge Elimination System Permit: DEQ is responsible for administering the National Pollutant Discharge Elimination System (NPDES) Program in Virginia. The permits issued through this program are known as Virginia Pollutant Discharge Elimination System (VPDES) permits. These permits address both point and nonpoint source pollution discharges into waters of the commonwealth. Nonpoint source pollution is addressed through DEQ's requirement for a VPDES permit of owners/operators of Municipal Separate Storm Sewer Systems (MS4s) (this includes municipalities that meet certain population thresholds) and certain industries, which are categorized as having potentially pollutant laden stormwater discharges. One such industrial category is that of construction activities which disturb five acres of land area or more.

Virginia Water Protection Permits: Any project that requires federal permits for discharge of dredge material or fill in a waterway or wetland (Clean Water Act, Section 404), work or construction in a navigable waterway (Rivers and Harbors Act, Section 10), or a water withdrawal is reviewed by DEQ for issuance of a Virginia Water Protection (VWP) Permit. Federal permits must comply with the VWP permitting program (as authorized by the CWA Section 401).

Chesapeake Bay Local Assistance Department

The Chesapeake Bay Local Assistance Department (CBLAD) administers the Chesapeake Bay Preservation Act (CBPA) and Regulations. The CBPA is designed to improve water quality in the Chesapeake Bay and its tributaries by requiring wise resource management practices through zoning, comprehensive planning, and ordinances establishing protected areas and defining

specific water quality protection measures. The CBPA expands local government authority to manage water quality and establishes a detailed relationship between water quality protection and local land use decision-making. The CBPA designates a state program, administered by CBLAD and implemented by local governments in Tidewater, Virginia (Tidewater as defined within the CBPA). Local governments outside the Tidewater area are enabled to adopt similar zoning, planning and resource protection ordinances.

Virginia Department of Transportation

The Virginia Department of Transportation compliance with the ESC regulations begins with the project planning. The project design takes into consideration the site topography, soils, drainage patterns and natural vegetation of the site. Project plans incorporate erosion and sediment controls to prevent excessive on-site damage and off-site runoff. Disturbed areas are stabilized after final grade has been attained. Projects are monitored daily by project inspectors and routinely by district environmental monitors, who are certified by DCR as erosion and sediment control inspectors. An Environmental monitor is located in each of VDOT's nine construction districts and an erosion and Sediment Control program manager, who is certified by DCR as a program administrator, is located in VDOT's central office.

Virginia Department of Health

The Virginia Department of Health (VDH) is responsible for protecting public health and to ensure that all sewage is disposed of in a safe and sanitary manner.

On-site Sewage Disposal Program: VDH regulates the construction, operation, expansion and modification of on-site sewage disposal systems. VDH also requires the correction of failing on-site disposal systems.

Department of Game and Inland Fisheries

The Department of Game and Inland Fisheries (DGIF) provides environmental analysis of projects or permit applications submitted or coordinated through the Virginia Department of Environmental Quality (DEQ), the Virginia Department of Transportation (VDOT), the

Virginia Marine Resources Commission (VMRC), the Virginia Department of Mines, Minerals and Energy (DMME), the U.S. Army Corps of Engineers (ACOE, Corps), the Federal Energy Regulatory Commission (FERC), and other state or federal agencies. In many cases, environmental reviews are conducted for several agencies simultaneously, since jurisdictions of state and federal agencies often overlap. DGIF's role in these procedures is to determine likely impacts of proposed projects upon fish and wildlife resources and habitats; to evaluate alternatives to the proposed project; and to recommend appropriate measures to avoid, reduce, or mitigate for those impacts. In conducting these reviews, potential impacts from NPS are addressed.

All State Agencies

All state agencies are required to comply with the ESC and SWM program requirements, as well as local CBPA ordinance requirements.

Local Governments

Local governments implement the ESC program as well as other state mandated programs such as VPDES, CBPA and the voluntary SWM program.

Planning District Commissions

Planning District Commissions (PDCs) were organized to promote the orderly and efficient development of the physical environment by encouraging and assisting governmental subdivisions to plan for the future. PDCs are involved in assisting local governments to comply with NPS pollution regulations such as ESC, SWM, CBPA, etc., and recommending improved implementation procedures.

Soil and Water Conservation Districts

Local soil and water conservation districts (SWCDs) provide advisory assistance and promote local government compliance with ESC control, SWM, CBPA and other NPS pollution program requirements. In some cases, the SWCD provides plan review and approval functions for the local government.

Virginia Cooperative Extension

The Virginia Cooperative Extension (VCE) provides educational programs to citizens regarding land use and water quality issues. Specifically, VCE develops and implements educational programs for home gardeners and professionals in horticulture and landscaping industries regarding techniques to minimize pollution from nutrients, pesticides and soil erosion resulting from commercial, private and governmental landscape installations, horticultural businesses and related activities.

ISSUE IDENTIFICATION & PROGRAM ASSESSMENT

The interagency Construction and Development workgroup, identified four source subcategories as being the major NPS pollutant concerns related to construction and development activities. These four source subcategories and respective pollutant categories are summarized in the table below and later described in detail with accompanying strategies to improve reductions in pollutant loads.

SOURCE CATEGORIES

| SOURCE CATEGORY | POLLUTANT CATEGORY | | | |
|--|--------------------|-----------|--------|-----------|
| | SEDIMENT | NUTRIENTS | TOXICS | PATHOGENS |
| Erosion and sediment from construction sites | T | T | | |
| Stream channel erosion due to increased volume and rates of flow resulting from increased impervious cover | T | T | | |
| Nonpoint source pollution from new and existing developed surfaces | T | T | T | T |
| Increases in new and failing on-site sewage disposal systems | | T | | T |

1. Erosion and Sediment Control on Construction Sites

The urbanization process begins with construction activities that disturb stabilized ground surfaces and expose highly erodible fine grained subsoils to wind and rain erosion. Soil particles, along with bounded nutrients and other pollutants, can create significant particulate and soluble pollutant loads discharged through stormwater runoff into surface and ground water.

NPS Pollution Control Programs:

DCR Erosion and Sediment Control Program: The Virginia Erosion and Sediment Control (ESC) Law requires that any person commencing a land-disturbing activity larger than the minimum threshold of 10,000 square feet, except activities exempt from the law, are required to submit an erosion and sediment control plan for review and approval prior to such activities. Local governments are authorized to implement a threshold of less than 10,000 square feet for land-disturbing activity.

Once the plan is approved, it is the responsibility of the owner to ensure its implementation.

The ESC law mandates local governments with administration, plan submittal - review - approval, project inspection, and enforcement responsibilities on private and municipal development projects. The ESC law mandates DCR with the responsibility of overseeing local government programs. This oversight responsibility includes an evaluation of the consistency of local government implementation with minimum standards of effectiveness as required by the regulations. DCR is also mandated to inspect and enforce state agency and utility company annual plan projects. In addition, DCR is authorized to act on behalf of a local program or an aggrieved citizen in pursuing enforcement actions against a violator. DCR has developed and maintains an Erosion and Sediment Control Handbook (latest edition - 1992), which contains conservation standards to guide in the development and implementation of ESC plans.

Code reference:

Erosion and Sediment Control Law -§10.1-560 et seq; *Code of Virginia*; Erosion and Sediment Control Regulations 4VAC50-30; Erosion and Sediment Control Certification Regulations 4VAC50-50.

DEQ Virginia Pollution Discharge Elimination System Permit (VPDES) for Construction Activities: DEQ requires a VPDES permit for certain industries that potentially contribute pollutants to stormwater runoff. Construction activities that disturb five acres or more (with the possible reduction of the permit threshold to one acre of disturbance) are considered to be such an industry, and therefore are required by law to obtain a VPDES permit.

The conditions of this permit generally require that a pollution prevention plan be designed and implemented to prevent contaminated runoff from leaving the construction site.

Code reference: Virginia Pollution Discharge Elimination System Permit Regulation - §62.1-44.15 et seq; *Code of Virginia*; Virginia Pollution Discharge Elimination System 9VAC25-30.

CBLAD CBPA Regulations: The CBPA requires local governments in Tidewater, Virginia to designate Chesapeake Bay Preservation Areas and adopt a land management program based on the Chesapeake Bay

Preservation Areas Designation and Management Regulations. Chesapeake Bay Preservation areas include Resource Protection Areas (RPAs) and Resource Management Areas (RMAs). Sensitive features such as tributary streams, shorelines and many wetlands are included in RPAs along with a 100 foot buffer adjacent to these features. The buffer is deemed to achieve a 75 percent reduction in sediments. RMAs are designated contiguous to the entire inland boundary of the RPA, and in many localities include the entire jurisdiction. Within Chesapeake Bay Preservation Areas, the threshold for ESC requirements is lowered from 10,000 to 2,500 square feet of land disturbance. In addition, there are requirements for no-net increase in stormwater pollutant loadings from new development and a 10 percent reduction in stormwater loadings from redevelopment. These requirements can be met through on-site best management practices or through an approved regional stormwater management program. The regulations also require that the site design criteria of minimizing land disturbance and impervious cover, and preserving existing vegetation, be incorporated into the local development review process.

The CBPA regulations contain performance standards which afford additional protection against erosion and sedimentation damage control by minimizing land disturbance and preserving existing vegetation. Additional performance standards associated with replanting and revegetation requirements provide long-term soil stabilization benefits.

Code Reference: Chesapeake Bay Preservation Act - §10.1-2100 et seq; *Code of Virginia*; Chesapeake Bay Preservation Area Regulations 9VAC10-20

Issue Identification and Description:

A. Local government adopted programs are inconsistent with the state Erosion and Sediment Control program's minimum standards of effectiveness.

There are 166 local government adopted Erosion and Sediment Control programs within the commonwealth which includes towns, cities, and counties. During 1998, approximately 75 per cent of these local ESC programs were considered to be inconsistent with the minimum standards of effectiveness as established by the Virginia Erosion and Sediment Control Law and

Regulations. In 1992, the local program inconsistency level was approximately the same.

Through an evaluation of historical information regarding local program implementation and DCR services to local governments, the following items were determined to be major contributors towards local program inconsistencies:

- C since 1990, extensive changes to the ESC law have had comprehensive impacts to the administration of both the state and local ESC programs. While these changes in the law and regulations have resulted in necessary increases in the authority and in the educational requirements of personnel working within the statewide ESC program, the actual implementation of these changes to the law have not evolved into improvements in the statewide program;
- C lack of state agency and local staffing resources and the broad array of expertise needed in order to meet all mandated responsibilities;
- C limited understanding of the economic costs and benefits of administering both state and local ESC programs;
- C limited understanding of the environmental costs and benefits of administering both state and local ESC programs; and,
- C limited information and data on urbanization impacts which would be used to effectively prepare the state and local programs to make necessary improvements in respective ESC programs.

In addition, upon evaluation of urban growth trends within the commonwealth and the related potential for costly economic and environmental impacts of an unsuccessfully implemented ESC program, the resources allocated to the statewide ESC program are significantly less than that dedicated to other resource protection programs.

In summary, limitations of successful local ESC programs appear to be derived from the lack of information which adequately quantifies the costs of all program services rendered and the correlating recovery

of these costs from plan review, inspection and permit fees as by the ESC law. Therefore, tremendous efforts are needed by the state program in order to provide this integral administrative guidance. Administrative guidance would clearly identify the environmental and economic benefits of an effective (and appropriately funded) ESC program to the general public. Additionally, provision of environmental and economic data would foster greater support for the need of effective program implementation and, therefore, become a local priority.

B. State agencies are non-compliant with the state Erosion and Sediment Control program's minimum standards of effectiveness.

The ESC Law and Regulations mandate state agencies to ensure compliance on the projects they are responsible for. This provision of the law and other provisions that remove state agencies from plan review, inspection and enforcement jurisdiction of local governments, requires state agencies to take a leadership role in the successful implementation of the state's ESC program in order for the law to be equitably applied to all citizens of the commonwealth. However, historical and current compliance rates indicate that regulated state agency projects do not reflect success in attaining this leadership role. In addition, if the leadership role in compliance with the ESC law was attained by state agencies, DCR staff's primary workload would be dedicated to local government and citizen support, which is the full intent of the law and DCR's mission.

However, as indicated previously, the ESC law dictates state program responsibilities which, based on the number and complexity of state agency projects, require 70 per cent of DCR ESC staff's estimated annual workload to be dedicated solely to state agency projects. This workload imbalance on state agency projects and concurrent compliance rate has helped identify a number of initiatives (presented as strategies below), some of which have already been implemented. These strategies will allow for state agencies to incorporate a much more comprehensive system of accountability, similar to that of local governments and, therefore, enable them to successfully attain a leadership role in the implementation of the ESC program.

C. Consistent enforcement of ESC requirements on active private and state agency projects

A historic assessment of enforcement activities and the resulting remediation or abatement efforts does not reflect consistent and effective enforcement of the state law and regulations on public and private development projects. A review of the available compliance and consistency data for calendar year 1998 indicates that most ESC jurisdictional authorities were identified as having major deficiencies in carrying out effective enforcement of the ESC Law and Regulations. Legal resources, enforcement education, program prioritization and staffing resources were identified as major contributors to the ineffective execution of the ESC enforcement procedures.

Enforcement procedures must follow a formula of due process in order to ensure fair judgement and mitigation. Enforcement procedures defined within the law are specific in terms of actions and authority, as well as the time frames in which those actions should occur. However, detailed enforcement guidelines that clearly identify efficient and effective enforcement procedures do not exist. As a result, the majority of local governments do not exercise their full authority as delegated by the ESC Law and Regulations including the locally adopted ordinance. Additionally, state agencies do not exercise their full authority provided them by the ESC Law and Regulations. In contrast, however, some local governments have adopted "Enforcement Guidelines" that utilize fines and penalties as enforcement tools. Executing such guidelines has proven very successful in demonstrating that effective enforcement leads to effective implementation.

D. Data collection and analysis of land use trends and urban nonpoint source program indicators for the purpose of supporting local program and state agency ESC initiatives

Trends in land use, development activity, disturbed acreage, water quality monitoring, and erosion control costs and efficiencies can be very effective in developing a comprehensive assessment of the statewide ESC program. Data collection efforts at the state and federal level do not typically correlate into local program support documentation. This information can be used to support immediate needs for appropriate resources and local program prioritization. Most importantly, compiling such data and returning it to local governments in a local

watershed format would enable localities to better assess and prioritize local environmental and economic trends and needs.

E. Improved coordination of resources among state agencies with responsibilities for oversight of land disturbing activities

DCR, DEQ and CBLAD all have a role in the land disturbing and conversion process at both state and local levels. Various local government oversight responsibilities, as well as permit requirements, can and should be coordinated in a more effective fashion with the goal of more effective implementation and enforcement.

F. Education of citizens, contractors, consultants, land developers, land managers, and local and state government officials on the environmental and economic impacts of damage resulting from sedimentation, and the legal requirements of the state's ESC program

The ESC training courses are not designed to educate the general public. Rather, the primary focus of the training is local government implementation of ESC programs. Citizens whose property has been adversely affected from non-compliant projects, or citizens who are aware of inequitable and/or ineffective enforcement of the state's laws have not had access to educational opportunities on abatement and appropriate enforcement actions and responsibilities required by the law. In general, there are no educational programs available to the diverse range of stakeholders affected by ESC management and program implementation.

The karst groundwater program and Project Underground have distributed brochures and other information about the importance of recognizing karst features, proper site investigation and planning, control of runoff, erosion, and sedimentation, and stormwater management during construction in karst areas. A new brochure on E&S in Karstlands will be developed in 2000. Several local and regional karst workshops have been held with the SWCDs and PDCs targeted at engineers, contractors, local officials, and developers. DCR staff routinely addresses county planning commissions and Boards of Supervisors on karst issues.

G. Roadside ditch maintenance policies and procedures should be established to guide local and state maintenance operations in an environmentally sound, economically achievable, and effective manner

Rural roadside ditches tend to be a collection and conveyance system for relatively clean water from undeveloped or open space areas. In order to keep these rural roads safe, these ditches must be maintained and kept free of debris, vegetation and even sediment. Unfortunately the nature of many rural, and even urban roads and associated right-of-ways, reduces or eliminates the opportunity to expand or improve these ditches so as to allow for non-erosive conveyance and maintenance. Therefore, these ditches can often become sources of sediment to receiving streams.

H. Improvements and revisions are needed in existing baseline soils' properties data as related to surface and groundwater hydrology characteristics altered from their natural conditions at the commencement of construction activities

Current erosion and sediment control plan requirements include using of site-specific soils data to calculate potential erodibility characteristics and alterations to surface and groundwater hydrology that occurs from the commencement of construction activities through their completion. However, a limited number of modernized soil surveys have been published; in some cases even initial soil surveys have not been compiled and published. The soil survey information is critical to developing an adequate plan that reflects project site conditions and concerns. The soil survey also provides tremendous economic benefits as a planning tool for designers to estimate the stability of onsite soils and whether offsite materials will be necessary for project demands.

There is also an identified need for the maintenance of an up-to-date Erosion and Sediment Control Handbook that incorporates accurate soils information, improved conservation technologies, changes/improvements in engineering and materials standards, changes/improvements of the ESC Law and Regulations, and numerous other program educational needs and demands.

Relative to the information provided in a soil survey, soils engineering properties provided in soil surveys are

derived from agricultural plots that do not necessarily correlate to construction site plots/activities. There is an identified long-term need for improvement of baseline soils data that accurately reflect conditions of the developed landscape in order to design the appropriate conservation engineering practices. The improved soils data will also more accurately estimate potentially adverse impacts onsite and offsite of inappropriately designed and/or installed practices.

2. Stream Channel Erosion Due to Increased Volume and Rates of Flow Resulting From Changes in Land Use

The post-construction land surface condition includes a patchwork of impervious surfaces and improved stormwater conveyance systems. The combination of impervious surfaces and efficient conveyance of the runoff from these surfaces causes an increase in the volume, velocity, peak rate and frequency of bankfull discharges to receiving channels and streams, causing significant erosion of the natural stream systems. This erosion destroys stream channel habitat, smothers the very delicate micro-invertebrate benthic community within the channel and deposits the eroded soil and associated nutrients in downstream rivers, lakes, and tidal estuaries. Smaller soil particles may tend to remain suspended in the water column and block sunlight from reaching bottom vegetation, thus interrupting a vital link in the aquatic food chain.

NPS Pollution Control Programs:

DCR Erosion and Sediment Control Program: DCR'S ESC regulations require that receiving waterways and properties downstream of any land development project be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff. The regulations contain minimum provisions for the determination of adequacy of channels downstream of development projects. The lack of an adequate channel requires the implementation of either an alternative site design, channel improvements, detention, or a combination of such acceptable to the plan approving authority (local government, SWCD, or DCR).

Code reference:

Erosion and Sediment Control Law -§10.1-560 et seq; *Code of Virginia*; Erosion and Sediment Control Regulations 4VAC50-30; Erosion and Sediment Control Certification Regulations 4VAC50-50.

DCR Stormwater Management Program: The DCR SWM program contains a stream channel erosion component. It allows local governments to adopt various minimum technical criteria as well as a more comprehensive approach, which includes alternate criteria based on site specific stream channel morphology and other factors. The SWM Law acknowledges the stormwater management provisions promulgated pursuant to the ESC law by also requiring that receiving waterways and properties downstream of any land development project be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff. The SWM Law expands these provisions by incorporating local enabling authority for all of the facets of permanent SWM facility design, maintenance and inspections, as well as enforcement. In addition, the SWM Law creates flexibility to identify and address stream channel erosion issues on a watershed scale.

Code reference:

Stormwater Management Law-§10.1-603 et seq; *Code of Virginia*, Stormwater Management Regulations 4VAC3-20.

DEQ VPDES Municipal Separate Storm Sewer System (MS4) Permit: Municipalities meeting certain population criteria are required to implement a stormwater pollution prevention plan that reduces pollutants in runoff to the maximum extent practicable, identifies and eliminates illicit discharges to storm sewer systems, incorporates monitoring runoff, and a stormwater education program. Generally this plan includes a SWM ordinance that addresses increased rates of stormwater runoff and the NPS pollution associated with that runoff.

Code reference: Virginia Pollution Discharge Elimination System Permit Regulation - §62.1-44.15 et seq; *Code of Virginia*; Virginia Pollution Discharge Elimination System 9VAC25-30.

CBLAD CBPA Regulations: The points of emphasis within the CBPA regulations are the minimization of disturbed area and impervious cover, the preservation of existing vegetation and the preservation of buffer areas

designated as Resource Protection Areas (RPAs). These goals are compatible with efforts to minimize stream channel erosion since they typically result in reduced stormwater discharges associated with development. RPAs are generally adjacent to stream channels and wetlands. Preservation of these buffers will help maintain the soil stabilization properties of the adjacent vegetation. In addition, the CBPA regulations require Tidewater localities to lower the threshold for the requirement of an erosion and sediment control plan from a disturbance of 10,000 square feet to 2,500 square feet. This helps implement a stream channel erosion component for a greater number of development projects. Further, CBPA regulations require that the impact of increases in stormwater runoff are identified and addressed. Some locally adopted programs are employing stream restoration and protection as water quality.

Code Reference: Chesapeake Bay Preservation Act - §10.1-2100 et seq; *Code of Virginia*; Chesapeake Bay Preservation Area Regulations 9VAC10-20

The Karst Groundwater Program is studying the effectiveness of stormwater management practices in karst terrain, and is reviewing designs intended to prevent subsidence and collapses related to SWM in karst areas.

Issue Identification and Description:

A. Lack of a state wide mandate for local comprehensive stormwater management programs

The *Code of Virginia* enables local governments to adopt a comprehensive stormwater management program. The law allows that if a local government chooses to adopt a local program, then that program must be consistent with the minimum administrative and technical criteria found in the SWM Law and Regulations. Local governments, for the most part have chosen not to adopt a SWM program, choosing instead to rely on the stormwater provisions authorized by the ESC Law and Regulations. Unfortunately, this practice does not provide local governments with full enabling authority to address the management of stormwater runoff and remediation efforts in a comprehensive manner.

B. Develop statewide regulatory criteria that

provides for effective prevention and minimization of stream channel degradation resulting from land development and land conversion activities

The stream channel erosion component of the state ESC and SWM programs require that “downstream properties be protected from damages due to increases in volume, velocity and peak rates of flow due to land development activities...”. The technical criteria established in the regulations, however, do not consider these distinctly different characteristics of runoff. Rather, the criteria require a simple channel adequacy calculation based on velocity of flow. The regulatory language allows flexibility on the part of the plan approving authority to impose more comprehensive and channel specific criteria, as well as preventive development strategies. However, the interpretation of this criteria by the regulators, as well as the regulated community, has traditionally focused on the simplest solution: detention. This management strategy has proven, in many cases, to unnecessarily concentrate runoff and, due to increases in frequency and duration of peak flows, cause erosion.

C. Provide for more effective implementation of stream channel preservation strategies

The ESC and SWM regulations require that natural stream channel characteristics be preserved to the maximum extent practicable. There are a number of stream channel preservation standards and combinations of standards available, however, in most cases this performance standard is addressed by the stand-alone detention of increased volumes of runoff released at the pre-developed rate. The detention design is the most attractive alternative solution to the developer, as well as the consultant, because detention structures are the most economically practical structures to design and construct. However, when the design fails to achieve the goal of protecting downstream channels, the cost of mitigating off-site damages is not realized during the budgeting of a detention facility. Therefore, a detention structure may appear to be the most economically practical, but is not an appropriate stand-alone channel protection measure for all projects. Widespread use of stand-alone detention facilities on practically all projects in the commonwealth results in costly downstream damages incurred by the developer or, as in most cases, the local government and downstream property owners. There is sufficient evidence of the failure of this approach in historical inspection and complaint records which have revealed severely eroded channels

downstream of detention ponds throughout the commonwealth. Even as new and more effective materials and methods (such as the new criteria identified in previous goal) are being developed, the common design of choice remains the standard detention basin.

Chesapeake Bay Preservation Act (CBPA) performance standards require the preservation of stream channels and adjacent buffer areas. In addition, the required minimization of impacts to the land and existing vegetation are effective in promoting proper protection of the existing stream system. These standards are only applied in Tidewater, Virginia, even though local governments outside this area are enabled to adopt similar land and water resource protection ordinances. Clearly, there is a lack of incentive on the part of local governments to adopt such criteria, as well as on the part of the developer to implement these provisions voluntarily.

The cost-benefit to the local government in the form of reduced capital improvement expenditures to restore stream channels or eliminate the channel with a pipe system becomes the primary incentive in effective implementation of stream channel erosion policies. Likewise, developers and engineers must be able to identify costs and project requirements in order to consider new approaches to stream channel protection. Additional economic incentives and/or a better understanding of economic and environmental benefits of stream channel protection will further promote the use of new alternative stream channel protection standards and stream buffer preservation standards.

D. Management and maintenance of aging stormwater management BMP facilities

Many BMPs built for stream channel erosion have been built under the authority of the local ESC program. These facilities are often turned over to homeowners' associations for ownership and maintenance. In most cases, maintenance is not considered in the design of the basin and the homeowners' associations is not trained or equipped financially to perform annual and long-term maintenance. Once a stormwater BMP falls into disrepair the maintenance or repair costs can easily exceed the homeowners' associations' budget. Long-term maintenance agreements executed between the local government and the homeowners' associations may be difficult to enforce due to limitations in the ESC

Law. Stormwater basins in disrepair represent a significant liability to local governments due to the potential for basin failure and downstream damage, safety issues and repair costs.

E. Guidelines to assist in the state and federal permit process where regional stormwater facilities impact wetlands and other environmental resources

Increases in peak rates of runoff from existing developed areas have severely impacted stream channel systems. Many examples exist where the only opportunity to mitigate the impacts of the existing development is through the implementation of a regional BMP. The uncertainty of the various permit and resource protection requirements can often delay, and sometimes defeat, the implementation of a regional solution.

In western Virginia, and even in some parts of the Piedmont, the presence of surface channels is overshadowed by the presence of sinkholes leading to subsurface drainage systems. In many of these karst areas, sinkholes are commonly used as “natural” stormwater management structures for developing areas.

The use of sinkholes for any type of wastewater disposal can lead to groundwater contamination, off-site flooding, and aggravated subsidence problems. As natural depressions in the landscape; however, there is often no other alternative than to incorporate sinkholes into the design of stormwater management systems.

When sinkholes are modified to more easily accept drainage, especially for stormwater or liquid waste disposal, they are technically defined as Class V injection wells by the USEPA. Although Virginia has no program to control or track Class V injection wells, Karst Program staff have reviewed guidelines and policies from surrounding states, and distributed information to DCR and the SWCDs. The Program will continue to investigate and help remediate Class V injection wells that create water quality, flooding, and stability problems, and will cooperate with partner agencies to draft a state strategy to properly deal with Class V injection wells.

3. Nonpoint Source Pollution From New and Existing Developed Surfaces

Developed areas, especially impervious surfaces, tend to accumulate sediments, nutrients and possibly toxics. These pollutants are deposited from surface activities, such as urban transportation and service infrastructure, as well as from atmospheric deposition. These pollutants are then readily washed from these impervious surfaces and transported to receiving stream systems during rainfall events. Unstabilized or unmaintained pervious surfaces can also contribute a significant nonpoint source pollution load to stormwater runoff. Managed pervious areas such as lawns, golf courses and cemeteries are managed to maintain a healthy green appearance. A growing number of landscape companies and contractors have created efficient systems for delivering fertilizers and pesticides to the suburban landscape to help land owners maintain a lush green lawn area. In many cases these chemicals are applied with no evaluation or analysis of available nutrients within the soils, nor an understanding of the potential off-site impacts. Excess chemicals not bound by the soil or utilized by lawns/plantings are readily washed off the landscape by rainfall events and/or urban irrigation. Therefore, both on-site and off-site land and water resources may sustain adverse economic and environmental impacts from the excessive and unnecessary application of chemicals.

NPS Pollution Control Programs:

DCR Stormwater Management Program: The SWM law designates DCR as the program authority for implementing the SWM regulations for state agency projects. DCR also has oversight authority for those localities that choose to adopt a SWM program. The SWM Law does not require local governments to adopt a SWM program. If a local government does choose to adopt, they must be consistent with the minimum technical and administrative criteria found in the SWM Law and Regulations. Amendments adopted in 1998 included input from DEQ and CBLAD in order to have one technical standard that satisfies the conditions of all three agency programs.

The technical components of the SWM regulations contain provisions for addressing the quality of stormwater runoff. This provision includes performance-based and technology-based criteria. The performance-based criteria was developed to offer consistency with the CBLAD CBPA regulations, which also contain provisions for the quality of runoff. The performance-based criteria requires that the pollutant

load does not increase from the natural or pre-developed condition. A calculation procedure referred to as the Simple Method is used to calculate the annual phosphorus load associated with impervious covers. The natural or pre-developed load is assumed to be that which is associated with an impervious cover of 16 per cent. Localities are given the option of establishing an existing or pre-developed condition based on actual land cover conditions at the time of program adoption. The calculation procedure yields a pre- and post-developed phosphorus load. The post-developed load must be reduced by implementing a stormwater BMP according to a schedule of BMPs and associated target phosphorus removal efficiencies found in the regulations. In order to achieve the target removal, the BMPs must be designed in accordance with the *Virginia Stormwater Management Handbook, 1999*. The SWM performance-based water quality criteria also address property redevelopment. Redevelopment activities which meet percent impervious cover criteria must achieve a 10 per cent reduction in phosphorus loading.

The technology approach establishes that for any given development of a specific drainage area size and percent of impervious cover, there is a best available technology with which to address stormwater runoff. Again, the menu of BMP options is found in the regulations, and the BMPs must be designed and constructed in accordance with the *Virginia Stormwater Management Handbook, 1999*.

DEQ VPDES Municipal Separate Storm Sewer System (MS4) Permit and Industrial Permit: These permits are required for municipalities that meet certain population size criteria and for all industrial activities according to Standard Industrial Codes as published by DEQ. The permit requires a stormwater pollution prevention plan, which includes good housekeeping efforts to avoid opportunities for pollutants to enter stormwater runoff. A stormwater management plan that satisfies DCR stormwater management regulations is considered to satisfy the stormwater runoff plan requirements of the permit. A local SWM program that satisfies the stormwater management regulations satisfies the municipal program requirements.

CBLAD CBPA Regulations: The CBPA regulations are administered by local governments with oversight responsibility by CBLAD. The regulations require a no-net increase in pollutant discharge from affected areas. The areas designated for compliance are referred to as

Resource Management Areas (RMAs) and Resource Protection Areas (RPAs). RMAs are designated by evaluating soil characteristics, non-tidal wetlands, steep slopes and other sensitive areas. RPAs are designated as buffers adjacent to water resources such as perennial streams and wetlands. Additional performance measures require the preservation of green space and minimization of impervious cover.

The water quality criteria and other performance standards associated with the protection of environmental resources apply to developments within the RMAs only. Many localities within Tidewater, Virginia, have designated the entire jurisdiction as a RMA rather than carve out the RMA areas by environmentally sensitive features. This allows for the implementation of the performance standards across the entire jurisdiction. Otherwise, the standards apply only in those areas designated as RMA. Development within the RPA is prohibited unless it is a water dependent facility. Limited encroachment may be allowed through an exception process for lots recorded prior to adoption.

The CBPA regulations also address redevelopment within the RMAs. Redevelopment activities that meet percent impervious cover criteria must achieve a 10 per cent reduction in phosphorus loading.

Issue Identification and Description:

A. Lack of a statewide mandate for local government comprehensive stormwater management programs that include a pro-active strategies for the prevention of nonpoint source pollution associated with urbanization

Three programs in Virginia currently address water quality associated with urban development. None of these programs, however, mandate implementation statewide. The DCR SWM program is optional for local governments; the CBLAD CBPA Regulations are required in Tidewater, Virginia, only (and even then require water quality controls only in RMAs and RPSs), and the VPDES permit only applies to localities that meet certain population criteria and industrial activities.

B. Technical and administrative guidelines for the development and implementation of regional (watershed) water quality plans

Some localities within Tidewater, Virginia, have begun to develop regional water quality plans. These plans vary with the type and rate of development. Some include forms of pollutant load trading and credits. In general, the development of the plans has varied significantly with some very questionable assumptions built into the plans. There is no formal guidance for the development of these plans to ensure effective compliance with the performance standards found in either the CBPA Regulations or the SWM Regulations. Further, the SWM Law allows for the adoption of more stringent technical criteria as long as it is developed and adopted in accordance with a watershed study. Many localities do not have the necessary in-house expertise to develop such a study nor solicit a proposal without some idea of the scope of work needed to satisfy the program requirements.

C. Use more development options that minimize the degradation of water quality

The DCR stormwater program is an “after-the-fact” standard that requires SWM BMPs for developed condition runoff. The performance standards are based on impervious cover; they encourage minimization of impervious cover by resulting in reduced requirements for reduced impacts. The CBPA regulations, on the other hand, specifically identify the minimization of impervious cover, reduced development densities and the preservation of existing vegetation and buffer areas as performance standards. These preventive ideas should be established throughout stormwater runoff programs, as well as subdivision and zoning regulations, to encourage more environmentally sensitive development practices. The general philosophy is that it is easier and more economical to maintain clean runoff than try to clean up polluted runoff.

Stormwater retention basins act as collectors of contaminants, and therefore, should be sited away from public and private drinking water supplies

D. Regulatory enforcement authority and schedule of penalties for water quality related plan requirements

Current water quality regulations that address plan requirements, specifically CBPA regulations, do not contain specific enforcement criteria for local governments to pursue violations of a plan after the initial construction and development is complete. In other words, the specific buffer preservation requirements on

a plan of development prevents a developer from impacting the buffer. However, two years after the plan is complete, a homeowner may choose to clear the buffer to facilitate the drainage from his yard area or provide a clear scenic view of the adjacent water resource. Similarly, a water quality BMP required by the development of a housing subdivision may fall into disrepair or be modified by adjacent homeowners to the detriment of water quality.

E. Local government-adopted programs inconsistent with the state SWM Law and CBPA regulations’ minimum standards of effectiveness

There is little in the way of program guidelines with which to establish local program consistency. Input from local governments indicates a need for a checklist of local program consistency and effectiveness similar to that of the ESC program. Evaluations of local SWM and CBPA programs indicate that the lack of resources represents a major cause of deficient programs. This trend parallels the ESC local program reviews. The legislative authority is provided by law for local governments to recover costs associated with the services provided. The shortfall appears to be the inability to adequately quantify the costs of all services rendered, and then to recover those costs from plan review and permit fees. In addition, very little effort and guidance has been provided to identify the economic benefits of an effective (appropriately funded) SWM program to the general public. Providing this type of economic data would certainly foster greater support for making effective program implementation a local priority.

F. Education of citizens, contractors, consultants, land managers, and local and state government officials on the physical and legal impacts related to the degradation of water quality

Many water quality problems can be attributed to a lack of knowledge on the part of the average citizen about their potential impact on water quality throughout their daily lives. Recent surveys on the effectiveness of urban nutrient management education programs indicate that most people want to be good stewards of the environment, however, most do not understand even the basic impacts associated with daily activities, such as walking dogs or washing their cars in driveways.

G. Management and maintenance of aging stormwater management quality BMPs

Many BMPs built for the purposes of water quality are turned over to homeowners associations for ownership and maintenance. In most cases, maintenance is not considered in the design of the basin and the homeowners association is not trained or equipped financially to perform annual and long-term maintenance. Once a stormwater BMP falls into disrepair the maintenance or repair costs can easily exceed the homeowners association's budget. In addition, the locality may not be aware of a potential BMP failure resulting in potential pollutant export.

H. Water quality criteria to address all forms of land conversion

The SWM Regulations use impervious cover as a water quality indicator and ignore managed pervious areas such as golf courses, parks, cemeteries, etc. which can contribute significant nonpoint source pollution nutrient loads.

The regulations should also specifically address impacts to ground water via Class V injection wells or filled sinkholes in karst areas.

I. Data collection and analysis of land use trends and urban nonpoint source program indicators for the purpose of supporting local program and state agency water quality initiatives

Trends in land use, development activity, disturbed acreage, water quality monitoring, and erosion control costs and efficiencies can be very effective in developing a comprehensive assessment of the statewide stormwater NPS pollution program. Data collection at the state and federal level do not typically correlate to local program support documentation. This information can be used to support immediate needs for appropriate resources and local program prioritization. Most importantly, compiling such data and returning them to local governments in a local watershed format would enable localities to better assess and prioritize local environmental and economic trends and needs.

J. Improved coordination of resources among state agencies with responsibilities for water quality related impacts from land development and land conversion activities

DCR, DEQ and CBLAD all have a role in the land disturbing and conversion process, whether at the local

or state level, or both. Various local government oversight responsibilities, as well as permit requirements, can and should be coordinated in a more effective fashion with the simple goal of more effective implementation and enforcement.

4. Nonpoint Source Pollution From More New and Failing On-Site Sewage Disposal Systems

Developing communities outside of water/sewer system accessibility are continuing to grow within the commonwealth. On-site sewage disposal systems must be installed in order to properly treat and dispose of household wastewater. Nutrients and pathogens are the common pollutants in on-site systems that can have detrimental effects on surrounding ground and surface water resources. Improperly maintained systems and failing systems have been identified as contributing significantly to nonpoint source pollutant loads, with especially high failure rates in karst areas where domestic wells are impacted.

Pending change in Sewage and Handling Disposal Regulations which take effect October 1, 1999, increase the minimum setback between drainfield trench bottom and the seasonal water table. Current permitting and inspection procedures, as set forth in the regulations, appear to be adequately addressing the placement and proper use of drainfields. Regulations are also being implemented that incorporates private sector work in the on-site disposal program. Authorized Onsite Soil Evaluators (AOSE) are now licensed by Virginia Department of Health and permitted to do site evaluations for residential development; hence, construction permits can be issued without VDH first visiting the sites. This AOSE designation also incorporate a system of accountability and qualification requirements of such individuals.

NPS Pollution Control Programs:

On-Site Sewage Disposal Program: The VDH regulates the construction, operation, expansion and modification of on-site sewage disposal systems. VDH also requires the timely correction of failing on-site disposal systems.

Pilot programs: DEQ has been working with local governments establishing pilot programs to provide CWSRF loans for septic rehabilitation.

Issue Identification and Description

A. Lack of statewide maintenance policies and procedures to include the inspection and pumpout of existing on-site sewage disposal systems

Existing on-site sewage disposal systems are not required to adhere to standard maintenance procedures except where local Chesapeake Bay Preservation Act ordinances are enforced. VDH has always encouraged and publicized as policy and maintenance information that all systems need to be pumped out at least every three to five years.

B. More funding mechanisms are needed for on-site systems statewide which are identified as failures

There are insufficient sources of funding for known failing systems and clustered failures are extremely expensive to repair. Neither are there sufficient funds to assist private citizens with sinkhole collapses that threaten the integrity of on-site septic systems and drinking water wells.

C. A need for mechanisms, framework and tracking systems in order to assess failing systems and actual pollutant loadings

Current mechanisms, framework and tracking systems do not adequately assess failing onsite sewage disposal systems and the related environmental impacts.

D. Statewide training initiatives developed and implemented in cooperation with local governments and community colleges

Formal educational programs do not exist for local governments, developers, homeowners, and contractors regarding the operation and maintenance needs of on-site sewage disposal systems, including the potentially harmful impacts of a failed system. VDH has been working toward developing a training center for their staff, the private sector and interested citizens. This would offer classroom instruction as well as certification and demonstration of different systems.

OBJECTIVES (SHORT-TERM GOALS)

(For additional strategies, objectives, and tasks regarding implementation of urban management measures in the coastal zone refer to Chapter XIII Coastal Nonpoint Source Pollution Control Program.)

Objective 1. By the year 2005, 85 per cent of Virginia's local government adopted ESC programs will be fully consistent with the state's minimum standards of effectiveness

Objective 2. By the year 2005, all state and federal agencies will achieve compliance rates on projects subject to Erosion and Sediment Control and Stormwater Management regulations

Objective 3. By the year 2003, establish effective, efficient and consistent enforcement of Virginia's Erosion and Sediment Control Law and Regulations

Objective 4. By the year 2001, develop a statewide tracking database/spreadsheet to incorporate VDOT, DEQ, DCR and CBLAD local program and permit tracking information regarding regulated land-disturbing activities

Objective 5. By the year 2003, ensure that state agencies responsible for resource protection related to regulated land-disturbing activities operate in an efficient and coordinated fashion through the development and implementation of an operational Memorandum Of Understanding (M.O.U.)

Objective 6. By the year 2002, develop an educational outreach program utilizing varied communication media focused on providing the general public with a basic overall understanding of nonpoint source pollution as it relates to erosion and sediment control

Objective 7. By the year 2001, investigate roadside ditch maintenance activities relative to compliance with the ESC law and address through DCR's annual plan

review of VDOT's annual plan and specifications submittal

Objective 8. By the year 2008, conservation standards shall be developed to incorporate criteria, techniques and methods for various soil types, and the physical and chemical alterations to those soils that have resulted from construction and development land use changes

Objective 9. By 2005, establish a statewide mandate for the local adoption of comprehensive SWM ordinances

Objective 10. By the year 2003, develop and adopt state wide comprehensive and effective stream channel erosion control criteria established within the regulatory framework

Objective 11. By the year 2003, all local governments and state agencies will be implementing effective development options and economic incentives for the preservation of natural stream channels and stream channel buffers

Objective 12. By the year 2005 ensure that a minimum of 85 per cent of SWM BMPs (facilities) are tracked administratively and properly maintained

Objective 13. By the year 2003, provide guidance for the permit requirements associated with the environmental impacts of stormwater management ponds

Objective 14. By 2005, develop a comprehensive statewide mandate for the local adoption of comprehensive SWM ordinances to include water quality provisions

Objective 15. By the year 2003 develop technical and administrative guidelines for the development of watershed studies and implementation plans

Objective 16. By the year 2004 establish state wide planning and development guidelines and strategies such as "Low Impact Development" and "Innovative Site Design Techniques," which specifically minimize the impacts of development on water quality

Objective 17. By the year 2003 provide enforcement tools to ensure effective local implementation of local water quality mandates

Objective 18. By the year 2005, 85 per cent of Virginia's local government adopted SWM programs will be fully consistent with the state's minimum standards of effectiveness

Objective 19. By the year 2002, develop an educational outreach program utilizing various communication media directed at providing the general public with a basic overall understanding of nonpoint source pollution as it relates to urban activities such as lawn care, pets, household chemicals and cleaning agents, etc

Objective 20. By the year 2005 ensure that a minimum of 85 per cent of SWM BMPs (facilities) are tracked administratively and properly maintained

Objective 21. By the year 2005, establish minimum guidelines for controlling nonpoint source pollution from pervious areas

Objective 22. By the year 2001, develop a statewide tracking database/spreadsheet that incorporates DEQ, DCR and CBLAD local program and permit tracking information

Objective 23. By the year 2003, ensure that state agencies responsible for resource protection related to regulated land-disturbing activities operate in an efficient and coordinated fashion through the development and implementation of an operational Memorandum Of Understanding (M.O.U.)

Objective 24. By the year 2002, develop and implement comprehensive septic system maintenance policies and procedures for on-site sewage disposal systems

Objective 25. By the year 2005, develop mechanisms, framework and tracking systems in order to assess failing systems and actual pollutant loading

Objective 26. By the year 2003, develop and present statewide on-site sewage disposal educational

programs in cooperation with local governments

Goal 1 - Control nonpoint source pollutants related to erosion and sediment control on construction sites according to current Virginia Erosion and Sediment Control and Stormwater Management Laws and Regulations

| OBJECTIVE 1 | | | |
|--|-------------------|-------------|---------------------------------------|
| <i>By the year 2005, 85 per cent of Virginia's local government adopted ESC programs will be fully consistent with the state's minimum standards of effectiveness</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 1.1 Increase technical and administrative staff support to local governments for local program consistency components such as plan review, and complaint response and enforcement | •DCR •CBLAD | Ongoing | •General Fund |
| 1.2 Provide an "Erosion and Sediment Control for Contractor's" training course for contractors working within localities that wish to develop a "cradle-to-grave" system of accountability | •DCR | 2000-2001 | |
| 1.3 Develop watershed planning tools (e.g. local watershed maps depicting urbanization and NPS pollution trends, disturbed acreage, etc.) for localities in order to assist in prioritizing resource allocations and needs | •DCR •CBLAD | 2001 | •General Fund |
| 1.4 Compile detailed profiles of local government-adopted ESC programs to include: 1) disturbed acreage trends by watershed; 2) number, size and complexity of private projects; 3) project compliance ratings; 4) type and number of enforcement actions taken; 5) staff resources dedicated to ESC program; 6) local program administrative costs including personnel salary and benefit ranges; 7) fees and bonds structure; 8) fines and penalties structure; and 9) geographic, environmental and infrastructure complexities and limitations | •DCR •CBLAD | 2001 | •CZARA •319 Grant •General Fund |
| 1.5 Integrate detailed profile information into the program evaluations in order to identify any appropriate corrective actions | •DCR | 2001 | |

| | | | |
|--|--|------|--|
| 1.6 Develop economic, training and planning “tools” available to local governments in order to foster more efficient program implementation to ensure that staff resources do not have to continually increase in a linear relationship to population growth | <ul style="list-style-type: none"> •DCR •CBLAD | 2002 | <ul style="list-style-type: none"> •General Fund •WQIF •319 Grant |
|--|--|------|--|

| OBJECTIVE 1 (cont.) | | | |
|---|------------------------|-------------|-----------------|
| <i>By the year 2005, 85 per cent of Virginia's local government adopted ESC programs will be fully consistent with the state's minimum standards of effectiveness</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 1.7 Develop new and demonstrate existing economic incentives for program consistency | DCR | 2002 | •Grant Funds |
| 1.8 Compile local program data that identifies both the environmental and economic costs of non-compliance to properties being developed, as well as adjacent properties | •DCR •CBLAD | 2002 | |
| 1.9 Continue to provide basic to advanced levels of training for local governments to include empowering local governments to conduct their own training | •DCR | Ongoing | •General Fund |
| 1.10 Develop and maintain an "Urban Nonpoint Source Pollution Hotline," by which citizens can report alleged violations or nonpoint sources of pollution | •DCR •DEQ •CBLAD | 2000 | |
| 1.11 Support watershed planning with special studies to document groundwater flow paths and stormwater management techniques in karst areas. Develop appropriate guidelines for investigation, modeling/testing and design of Class V injection wells. Disseminate information to communities and counties, planning districts, SWCDs, agencies and contractors | •DCR | 2003 | |

| OBJECTIVE 2 | | | |
|--|-------------------|-------------|--------------------------------------|
| <i>By the year 2005, all state and federal agencies will achieve compliance rates on projects subject to Erosion and Sediment Control and Stormwater Management regulations</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 2.1 Require submittal of state agency ESC plans to DCR and CBLAD for a coordinated ESC/CBPA review of qualifying projects (> 2,500 sq.ft.) within Chesapeake Bay Resource Management Areas | •DCR •CBLAD | 2000 | |
| 2.2 Provide basic to advanced levels of training as appropriate for state agency personnel assigned to duties related to the plan review, inspection and enforcement components of the state's ESC program; state agencies will be required to demonstrate that plan review, inspection and enforcement responsibilities are executed by personnel who meet training and certification requirements similar to that of local program personnel | •DCR | 2001 | •General Fund |
| 2.3 Promote the requirement within the Capital Outlay Process for contractors bidding on regulated state projects to complete the "Contractor Training Course" (This requirement would help state agencies set a lead example in a "cradle-to-grave" system of accountability for local governments to follow) | •DCR | 2001 | |
| 2.4 Develop and provide basic to advanced levels of training that encompass the complex nature of roadway, utility and other linear projects | •DCR | 2002 | •General Fund |
| 2.5 Develop new and more efficient inspection, plan development, plan review and enforcement tools to ensure that DCR and state agency ESC staff resources do not have to continually increase in a linear relationship to the number of state agency projects and/or population growth trends | •DCR | 2002 | •General Fund •319 Grant •WQIF |
| 2.6 Establish an ESC compliance evaluation system for state agencies to track disturbed acreage data by watershed basin, project start and completion dates, estimated percent completion on long term projects and compliance ratings throughout the life of projects in order to develop priorities for improving ESC implementation | •DCR | 2002 | •CZARA |
| 2.7 Correlate the compliance evaluation system data from strategy 2.6 into a formula for estimating environmental and economic impacts to state agencies, and the state's land and water resources | •DCR | 2003 | |
| 2.8 Where appropriate, DCR will ensure federal consistency review of federal projects | •DCR | Ongoing | |

| OBJECTIVE 3 | | | |
|--|------------------------|-------------|--------------------------------------|
| <i>By the year 2003, establish effective, efficient and consistent enforcement of Virginia's Erosion and Sediment Control Law and Regulations</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 3.1 Develop a reporting and tracking database of statewide enforcement and abatement case histories in order to continually update enforcement and abatement guidance | •DCR | 2001 | •General Fund •CZARA |
| 3.2 Develop comprehensive compliance/enforcement guidelines that establish minimum standards of due process for enforcement actions and the assessment of fines and penalties to be utilized by program authorities as designated by the ESC law | •DCR | 2001 | •General Fund |
| 3.3 Develop comprehensive technical guidelines and potential costs for the abatement of damages resulting from non-compliance with the Erosion and Sediment Control Law and Regulations | •DCR | 2002 | •General Fund •CZARA |
| 3.4 Provide local governments, state agencies, citizens and legal community with education and technical training on federal, state and local requirements of the erosion and sediment control statutes, the adverse impacts of construction related damages to land and water resources, and the methodologies and potential costs for the abatement of these damages | •DCR •CBLAD •DEQ | 2002 | •General Fund |
| 3.5 Develop and maintain an "Erosion and Sediment Control Activity Hotline" through which concerned citizens can report alleged violations | •DCR | 2001 | •WQIF •319 Grant •General Fund |

| OBJECTIVE 4 | | | |
|---|---------------------------------|-------------|--|
| <i>By the year 2001, develop a statewide tracking database/spreadsheet to incorporate VDOT, DEQ, DCR and CBLAD local program and permit tracking information regarding regulated land-disturbing activities</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 4.1 Establish a protocol among the appropriate state agencies for nonpoint source pollution data collection, documentation and reporting, to include the facilitation of local government access, data update procedures and presentation formats | •DCR •CBLAD •DEQ •VDOT | 2001 | •CZARA |
| 4.2 Develop a locality specific executable database (compatible with the statewide tracking system) for input of local government urbanization trends and environmental conditions; provide for the electronic transfer of the locality specific database to a central database on a quarterly basis for assimilation into statewide data and redistribution to localities to assist in depicting large (tributary) watershed urbanization trends | •DCR •CBLAD •DEQ •VDOT | 2001 | •WQIF •CZARA •319 Grant •General Fund |
| 4.3 Dedicate staff within each agency to compose an interagency workgroup to monitor and update data reporting | •DCR •CBLAD •DEQ •VDOT | 2001 | |
| OBJECTIVE 5 | | | |
| <i>By the year 2003, ensure that state agencies responsible for resource protection related to regulated land-disturbing activities operate in an efficient and coordinated fashion through the development and implementation of an operational Memorandum Of Understanding (M.O.U.)</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 5.1 Dedicate DCR, CBLAD and DEQ staff to work on an interagency workgroup to identify operational overlap of agency roles and responsibilities | •DCR •DEQ •CBLAD | 2001 | |
| 5.2 Through the work group established in the strategy 5.1, identify the agency with primary responsibilities regarding each specific program area in order to consolidate and streamline state agency services | •DCR •DEQ •CBLAD | 2002 | |
| 5.3 Incorporate the findings of the previous strategies into an operational M.O.U. | •DCR •DEQ •CBLAD | 2003 | |

| OBJECTIVE 6 | | | |
|---|---|-------------|---|
| <i>By the year 2002, develop an educational outreach program utilizing varied communication media focused on providing the general public with a basic overall understanding of nonpoint source pollution as it relates to erosion and sediment control</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 6.1 Develop and present "Urban Nonpoint Source Pollution" courses for citizens across the commonwealth to include basic information regarding the state ESC program | •DCR | 2001 | •WQIF •319 Grant |
| 6.2 Develop and maintain an interactive web site that allows all stakeholders to access watershed, regional and statewide information specific to ESC program implementation and related links | •DCR | 2001 | •General Fund •WQIF •319 Grant •NOAA |
| 6.3 Develop an integrated state agency-local government nonpoint source pollution response network that effectively crosses program boundaries to identify jurisdictional responsibilities, minimizes transfer of responsibility and directs citizenry to state agency points-of-contact with primary/lead responsibilities | •DCR •CBLAD •DEQ •VDH •VDOT •CBF | 2001 | |
| 6.4 Develop a brochure on ESC in karst areas for local officials and contractors. Develop a second brochure on ESC near sensitive aquatic habitats and natural areas. | •DCR | 2000-2001 | •319 Grant •VDOT |

| OBJECTIVE 7 | | | |
|--|-------------------|-------------|-----------------|
| <i>By the year 2001, investigate roadside ditch maintenance activities relative to compliance with the ESC law and address through DCR's annual plan review of VDOT's annual plan and specifications submittal</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 7.1 VDOT will conduct ESC inspections and review the inspection results of roadside ditch maintenance activities to include percent stabilization, actual time taken to establish permanently stabilized roadside ditches and a report of these findings to DCR | •VDOT •DCR | 2000 | |
| 7.2 DCR and VDOT will evaluate roadside ditch ESC maintenance procedures to include randomly inspecting a portion of local and state agency ditch cleaning projects annually | •DCR •VDOT | 2000 | |
| 7.3 DCR and VDOT will continue to work cooperatively on ESC staff and contractor certification programs. In addition, DCR and VDOT will review findings of statewide inspection results. If inspection results reveal significant erosion and sedimentation impacts, DCR and VDOT will take necessary steps to work to address ditch cleaning operations | •DCR | 2001 | |
| 7.4 DCR will continue to work with the VDOT Districts on hydrogeologic issues in karst terrain, and will continue to cooperate in the protection of sensitive natural areas and ecological communities. | •DCR •VDOT | 2000-2004 | •319 Grant |

| OBJECTIVE 8 | | | |
|---|----------------------------------|-------------|--------------------------------------|
| <i>By the year 2008, conservation standards shall be developed to incorporate criteria, techniques and methods for various soil types, and the physical and chemical alterations to those soils that have resulted from construction and development land use changes</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 8.1 DCR will solicit and compile up-to-date changes and improvements in internationally recognized engineering technologies and practices for the effective control of soil erosion, sediment deposition and surface runoff, and incorporate this information into an updated Erosion and Sediment Control Handbook | •DCR | 2002 | •General Fund •319 Grant •WQIF |
| 8.2 Develop an interagency task force to investigate the accuracy of current baseline soils' engineering properties and data regarding altered land surfaces and the resulting physical and chemical changes that occur to natural soil conditions, and surface and groundwater hydrology (existing soil survey baseline data is derived from agricultural land use plots and is therefore not representative of construction site project information from commencement of construction activity throughout final developed site conditions) | •NRCS •DCR •VDOT •CBLAD | 2002 | |
| 8.3 Incorporate the findings from strategy 8.2 into a plan to perform engineering soil surveys on construction and development projects representing the wide variety of soils throughout Virginia. The performance of such surveys should provide increased accuracy of engineering calculations and the related efficiencies and effectiveness of conservation standards and practices developed to minimize the on-site and off-site environmental and economic impacts of construction and development | •NRCS •DCR | 2005 | •319 Grant •WQIF |
| 8.4 Accelerate current schedule of soil surveys and soil survey updates to include data derived from developed soil conditions in all Virginia counties. Counties which have been awaiting the compilation and publication of final surveys and/or have never been surveyed should take first priority. Rapidly urbanizing counties should then be prioritized to include developed soil conditions data | •NRCS •DCR •CBLAD | 2005 | •319 Grant •WQIF |
| 8.5 Incorporate findings and developed soil survey data information to include appropriate revised conservation standards to reflect more accurately calculated efficiencies and effectiveness into an updated Erosion and Sediment Control Handbook | •DCR | 2008 | •General Fund •319 Grant •WQIF |

Goal 2 - Adequately address nonpoint source pollutants related to stream channel erosion due to increased volume and rates of flow resulting from increased impervious cover

| OBJECTIVE 9 | | | |
|--|---|-------------|-------------------|
| <i>By 2005, establish a statewide mandate for the local adoption of comprehensive SWM ordinances</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 9.1 Integrate DCR's ESC and SWM program services to implement more effective and efficient local government program and state agency oversight as well as technical program implementation | •DCR | 2001 | |
| 9.2 Correlate development and land use statistical data with water quality reports, property damage reports, citizen complaints, and other evidence of water quality degradation, stream channel erosion, localized flooding and other areas of local program needs for the purposes of reporting to the Virginia General Assembly on the need for amendments to the ESC and SWM laws. The recommended language of these amendments may identify the need for integrated local ESC and SWM ordinances that address all of the components of stormwater management, including the water quality issues associated with construction activities, stream channel erosion and nonpoint source pollution associated with land development and land conversion activities, localized flooding and maintenance of temporary and permanent erosion control and stormwater facilities | •DCR | 2001 | |
| 9.3 Increase technical staff support to local governments to assist in the required integration of ESC and SWM programs for local program consistency components such as plan review, and complaint response and enforcement | •DCR •CBLAD | 2002 | |
| 9.4 Identify and provide financial resource to local governments to aid in the development and implementation of stormwater management programs | •DCR •CBLAD •DEQ •PDCs •SWCDs | 2004 | •To be determined |

| OBJECTIVE 10 | | | |
|--|---|-------------|--|
| <i>By the year 2003, develop and adopt state wide comprehensive and effective stream channel erosion control criteria established within the regulatory framework</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 10.1 Establish an interagency workgroup representing the physiographic regions of the state to develop amendments to the stream channel erosion control component of the ESC and SWM Regulations. These amendments are to include engineering principles to support the relationship between low impact development practices that encourage infiltration (groundwater recharge) and reductions in stormwater discharge, as well as the preservation of natural stream channel characteristics and buffers | <ul style="list-style-type: none"> •DCR •CBLAD •DEQ •PDCs | 2000 | |
| 10.2 Publish a Notice of Intended Regulatory Action and convene an ad-hoc committee for the purposes of drafting amendments to the ESC and SWM regulations in coordination with the recommendations of the interagency workgroup established in strategy 10.1 | <ul style="list-style-type: none"> •DCR | 2001 | |
| 10.3 Increase technical staff support to local governments to assist in the implementation of the comprehensive stream channel erosion regulations | <ul style="list-style-type: none"> •DCR •CBLAD | 2001 | <ul style="list-style-type: none"> •General Fund |
| 10.4 Develop a technical training program to educate local government and state agency officials about the implementation of the amended stream channel erosion control criteria | <ul style="list-style-type: none"> •DCR •CBLAD | 2001 | <ul style="list-style-type: none"> •General Fund •WQIF |
| 10.5 Provide advanced technical stream channel protection training within the ESC Training and Certification Program | <ul style="list-style-type: none"> •DCR | 2001 | <ul style="list-style-type: none"> •General Fund |

| OBJECTIVE 11 | | | |
|---|------------------------|-------------|--------------------------------------|
| <i>By the year 2003, all local governments and state agencies will be implementing effective development options and economic incentives for the preservation of natural stream channels and stream channel buffers</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 11.1 Provide education for citizens, contractors, consultants, land managers, and local and state government officials on the physical, legal, and economic impacts related to the degradation of drainage and stream channel systems | •DCR | 2001 | |
| 11.2 Demonstrate existing and develop new economic incentives for local government implementation of a comprehensive SWM program. Incorporate economic incentives into the local site development process for developers to satisfy preventive and minimization goals of stream channel degradation | •DCR •DEQ •CBLAD | 2002 | •CZARA |
| 11.3 Compile local program data that identifies both the environmental and economic costs of the lack of comprehensive stormwater management to both properties being developed and adjacent properties, and the combined effect on regional land and water resources | •DCR •CBLAD | 2001 | |
| 11.4 Provide basic and advanced levels of training about stream channel erosion criteria for local government and state ESC/SWM program personnel | •DCR •CBLAD | 2001 | •General Fund |
| 11.5 Develop watershed planning tools (e.g. local watershed maps depicting urbanization and NPS pollution trends, disturbed acreage, etc.) for localities to assist in prioritizing resource allocations and needs | •DCR | 2002 | •General Fund |
| 11.6 Develop economic, training and planning "tools" and make available to local governments to foster more efficient program implementation to ensure that staff resources do not have to continually increase in a linear relationship to population growth | •DCR •CBLAD | 2002 | •General Fund •WQIF •319 Grant |

| OBJECTIVE 12 | | | |
|--|---|-------------|-----------------|
| <i>By the year 2005 ensure that a minimum of 85 per cent of SWM BMPs (facilities) are tracked administratively and properly maintained</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 12.1 Provide better maintenance related design guidance and education for localities and landowners with BMPs | •DCR | 2001 | |
| 12.2 Develop enabling authority and guidance for BMPs maintenance bonds | •DCR •CBLAD | 2001 | |
| 12.3 Develop guidance and samples of maintenance agreements | •DCR •CBLAD | 2001 | |
| 12.4 Provide financial and technical assistance for local government inventory of SWM BMPs | •DCR •CBLAD | 2002 | |
| 12.5 Develop and maintain SWM BMPs tracking system for local governments and state agencies | •DCR | 2002 | |
| OBJECTIVE 13 | | | |
| <i>By the year 2003, provide guidance for the permit requirements associated with the environmental impacts of stormwater management ponds</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 13.1 Establish a workgroup composed of federal (EPA, COE), state (DCR, DEQ, CBLAD, VIMS) and local officials and consultants to develop permit guidance | •DCR •DEQ •CBLAD •DGIF •EPA •ACE | 2001 | |
| 13.2 Formally adopt permit guidance language to guide the implementation of regional stormwater basins in accordance with environmental preservation regulations | •DCR | 2003 | |

Goal 3 - Adequately address nonpoint source pollutants related to new and existing developed surfaces

| OBJECTIVE 14 | | | |
|--|------------------------------|--------------------|------------------------|
| <i>By 2005, develop a comprehensive statewide mandate for the local adoption of comprehensive SWM ordinances to include water quality provisions</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 14.1 Integrate DCR's ESC and SWM program services to implement more effective and efficient local government program and state agency oversight as well as technical program implementation | •DCR | 2001 | |
| 14.2 Correlate development and land use statistical data with water quality reports, property damage reports, citizen complaints, and other evidence of water quality degradation, stream channel erosion, localized flooding, and other areas of local program needs for the purposes of reporting to the Virginia General Assembly on the need for amendments to the ESC and SWM laws. The recommended language of these amendments may identify the need for integrated local ESC and SWM ordinances that address all of the components of stormwater management, including the water quality issues associated with construction activities, stream channel erosion and nonpoint source pollution associated with land development and land conversion activities, localized flooding and maintenance of temporary and permanent erosion control and stormwater facilities | •DCR | 2002 | |
| 14.3 Increase technical staff support to local governments to assist in the required integration of ESC and SWM programs for local program consistency components such as plan review, and complaint response and enforcement | •DCR •CBLAD | 2002 | |
| 14.4 Amend CBLAD designation and management regulations, as proposed, to be consistent with DCR stormwater management water quality provisions. Provide technical and performance based standards promulgated by DCR in the context of CBPA compliance | •CBLAD | 2000 | |

| OBJECTIVE 15 | | | |
|--|---|-------------|-----------------|
| <i>By the year 2003 develop technical and administrative guidelines for the development of watershed studies and implementation plans</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 15.1 Establish an interagency workgroup to include DCR, DEQ, CBLAD and US Army Corps of Engineers officials for the purposes of drafting minimum guidelines for the development of regional watershed studies and implementation plans, which satisfy state and federal agency requirements | <ul style="list-style-type: none"> •DCR •DEQ •CBLAD •COE •PDCs | 2001 | |
| 15.2 Establish areas of additional research needed to verify groundwater impacts associated with the channelization of stormwater runoff and potential contamination associated with infiltration type stormwater BMPs | <ul style="list-style-type: none"> •DCR •DEQ •CBLAD | 2001 | |
| OBJECTIVE 16 | | | |
| <i>By the year 2004 establish state wide planning and development guidelines and strategies such as "Low Impact Development" and "Innovative Site Design Techniques," which specifically minimize the impacts of development on water quality</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 16.1 Establish a study group consisting of land planning, zoning, public works, and any other necessary component of the land development process to establish alternative (preventive) standards for development requirements related to road widths, parking requirements, cluster development, and other criteria related to impervious cover. The goal of this process shall be to incorporate these alternative development criterion into local zoning, subdivision and development requirements | <ul style="list-style-type: none"> •DCR •CBLAD •PDCs | 2001 | |
| 16.2 Provide site planning assistance and education to developers, consultants and public officials to implement the use of pro-active land use practices that minimize water quality impairments | <ul style="list-style-type: none"> •CBLAD •DCR | 2001 | |
| 16.3 Provide training and education to local planning and public works officials to reduce the practical conflict between public works, planning and environmental preservation objectives | <ul style="list-style-type: none"> •CBLAD •DCR | 2002 | |

| OBJECTIVE 17 | | | |
|--|------------------------|-------------|-----------------|
| <i>By the year 2003 provide enforcement tools to ensure effective local implementation of local water quality mandates</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 17.1 Develop a reporting and tracking system of statewide enforcement and abatement case histories relating to water quality impairments into a database to continually update enforcement and abatement guidance | •DCR •CBLAD •DEQ | 2001 | •CZARA |
| 17.2 Develop comprehensive Compliance/Enforcement Guidelines which establish minimum standards of due process for enforcement actions and the assessment of fines and penalties to be utilized by the program authority as designated by the SWM Law and Chesapeake Bay Preservation Act | •DCR •CBLAD •DEQ | 2001 | |
| 17.3 Develop comprehensive technical guidelines and potential costs for the abatement of damages resulting from non-compliance with the SWM Law and CBPA | •DCR •CBLAD •DEQ | 2002 | |
| 17.4 Provide local governments, state agencies, citizens and legal community with education and technical training on federal, state and local requirements of the stormwater quality statutes, the adverse impacts of development related water quality impairments, and methodologies and potential costs for the abatement of resulting damages | •DCR •CBLAD •DEQ | 2002 | |

| OBJECTIVE 18 | | | |
|---|------------------------|-------------|-----------------|
| <i>By the year 2005, 85 per cent of Virginia's local government adopted SWM programs will be fully consistent with the state's minimum standards of effectiveness</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 18.1 Increase technical staff support to local governments for local program consistency components such as plan review, and complaint response and enforcement | •DCR •CBLAD | 2001 | |
| 18.2 Provide basic to advanced levels of training for local government and state ESC program personnel | •DCR | 2001 | |
| 18.3 Develop new and demonstrate existing economic incentives for program consistency | •DCR •DEQ •CBLAD | 2001 | •CZARA |
| 18.4 Develop watershed planning tools (e.g. local watershed maps depicting urbanization and NPS pollution trends, disturbed acreage, etc.) for localities to assist in prioritizing resource allocations and needs | •DCR •CBLAD | 2001 | •CZARA |
| 18.5 Compile local program data that identifies both the environmental and economic costs of non-compliance to both properties being developed and adjacent properties | •DCR | 2002 | |
| 18.6 Develop economic, training and planning "tools" and make available to local governments to foster more efficient program implementation to ensure that staff resources do not have to continually increase in a linear relationship to population growth | •DCR •CBLAD | 2002 | |
| 18.7 Develop guidance for forecasting the costs of effectively implementing all of the components of a local SWM program | •DCR | 2002 | •CZARA |

| OBJECTIVE 19 | | | |
|---|---|-------------|---------------------|
| <i>By the year 2002, develop an educational outreach program utilizing a variety of communication media directed at providing the general public with a basic overall understanding of nonpoint source pollution as it relates to urban activities such as lawn care, pets, household chemicals and cleaning agents, etc</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 19.1 Develop and present "Urban Nonpoint Source Pollution" courses for citizens across the commonwealth that include the environmental and economic benefits of the ESC program to both on-site and off-site resources and properties | •DCR | 2001 | •WQIF •319 Grant |
| 19.2 Develop and maintain an interactive web site that allows all stakeholders to access watershed, regional and statewide information specific to urban nonpoint source pollution program implementation and related links | •DCR •CBLAD •DEQ | 2001 | |
| 19.3 Develop an integrated state agency-local government nonpoint source pollution response network that effectively crosses program boundaries to identify jurisdictional responsibilities, minimizes transfer of responsibility and directs interested parties to state agency points-of-contact with primary/lead responsibilities | •DCR •CBLAD •DEQ •VDH •VDOT •CBF | 2001 | |
| 19.4 Conduct training and education seminars for local citizens and land management officials on the legislative requirements of water quality programs, technical requirements for development projects and good housekeeping procedures to minimize impacts to water quality | •DCR •CBLAD •DEQ | 2001 | |

| OBJECTIVE 20 | | | |
|--|-------------------|-------------|-----------------|
| <i>By the year 2005 ensure that a minimum of 85 per cent of SWM BMPs (facilities) are tracked administratively and properly maintained</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 20.1 Provide better maintenance related design and siting guidance and education for localities and landowners with BMPs | •DCR | 2001 | |
| 20.2 Develop enabling authority and guidance for BMPs maintenance bonds | •DCR | 2001 | |
| 20.3 Develop and maintain SWM BMPs tracking system for local governments and state agencies | •DCR •CBLAD | 2002 | |
| 20.4 Develop guidance and samples of maintenance agreements | •DCR | 2001 | |
| 20.5 Provide financial and technical assistance for local government inventory of SWM BMPs | •DCR •CBLAD | 2002 | |

| OBJECTIVE 21 | | | |
|--|--------------------------|-------------|-----------------|
| <i>By the year 2005, establish minimum guidelines for controlling nonpoint source pollution from pervious areas</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 21.1 Establish an interagency task force to develop a technical policy for addressing runoff water quality from managed pervious areas such as golf courses, parks, cemeteries, etc. | •DCR •CBLAD •DEQ | 2001 | |
| 21.2 Develop legislation to require that fertilizers marketed for non-agricultural uses on residential and commercial property contain adequate directions for use which explains: (1) that nutrient runoff is detrimental to surface and ground water quality; (2) application rate recommendations; (3) the need to apply fertilizers only at seasonal times when plants are capable of active growth; and (4) that no spillage or application should occur on impervious surfaces such as roads and driveways | •DCR | 2001 | |
| 21.3 Contact 20 local franchises annually of major lawn service companies and seek signed water quality agreements in which firms meet DCR standards | •DCR | Ongoing | |
| 21.4 Develop pilot nutrient management plan format for golf courses | •DCR | 2001 | |
| 21.5 Develop 20 site-specific golf course nutrient management plans | •DCR | 2005 | |
| 21.6 Estimate the use of nitrogen containing deicers in Virginia and potential water quality impacts, determine the availability of non-polluting substitutes and evaluate the need for state strategies to limit their use on impervious surfaces | •DCR •VDOT | 2003 | |
| 21.7 Develop a voluntary "Urban Nutrient Management Training Program" for local governments, state agencies, recreational land managers, landscape superintendents, developers, and property owners who have responsibilities for establishing and maintaining open spaces | •DCR •VDOT •DEQ | 2003 | •WQIF |
| 21.8 Establish an inter-agency study committee to evaluate the stormwater impacts of nursery operations and the authority to address concerns under existing laws and regulations | •DCR •CBLAD •VDACS | 2001 | |

| OBJECTIVE 22 | | | |
|---|---|-------------|---|
| <i>By the year 2001, develop a statewide tracking database/spreadsheet that incorporates DEQ, DCR and CBLAD local program and permit tracking information</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 22.1 Establish a protocol among the appropriate state agencies for NPS pollution data collection, documentation and reporting to include the facilitation of local government access, data update procedures and presentation formats | <ul style="list-style-type: none"> •DCR •CBLAD •DEQ •VDOT | 2001 | |
| 22.2 Develop a locality specific executable database (compatible with the statewide tracking system) for local governments to input existing urbanization trends and environmental conditions. Provide for the electronic transfer of the locality specific database to a central database on a quarterly basis for assimilation into statewide data and redistribution back to localities to assist in depicting large (tributary) watershed urbanization trends | <ul style="list-style-type: none"> •DCR •CBLAD •DEQ •VDOT | 2001 | <ul style="list-style-type: none"> •WQIF •319 Grant •CZARA •General |
| 22.3 Dedicate staff within each agency to serve on an interagency workgroup that monitors and updates data reporting | <ul style="list-style-type: none"> •DCR •CBLAD •DEQ •VDOT | 2001 | |
| OBJECTIVE 23 | | | |
| <i>By the year 2003, ensure that state agencies responsible for resource protection related to regulated land-disturbing activities operate in an efficient and coordinated fashion through the development and implementation of an operational Memorandum Of Understanding (M.O.U.)</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 23.1 Dedicate DCR, CBLAD and DEQ staff to work on an interagency workgroup to identify operational overlap of agency roles and responsibilities | <ul style="list-style-type: none"> •DCR •DEQ •CBLAD | 2001 | |
| 23.2 Through the work group established in the strategy 23.1, identify the agency with primary responsibilities regarding each specific program areas to consolidate and streamline state agency services | <ul style="list-style-type: none"> •DCR •DEQ •CBLAD | 2002 | |

| | | | |
|---|------|------|--|
| 23.3 Incorporate the findings of the previous strategies into an operational M.O.U. | •DCR | 2003 | |
|---|------|------|--|

Goal 4 - Adequately address nonpoint source pollutants related to new and failing on-site sewage disposal systems

| OBJECTIVE 24 | | | |
|---|-----------------------------------|-------------|-----------------|
| <i>By the year 2002, develop and implement comprehensive septic system maintenance policies and procedures for on-site sewage disposal systems</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 24.1 Pumpout and maintenance policies and procedures will be developed to ensure that systems are operating and being maintained | •VDH | 2002 | |
| 24.2 Comprehensive planning tools will be developed for the treatment, disposal and reuse potential of septage | •VDH •Local Governments | 2002 | |
| 24.3 Specialized inspection policies and procedures will be developed to ensure that the integrity and operation of advanced and complex systems are thoroughly evaluated | •VDH | 2002 | |
| 24.4 Elements of an on-site system management program will be developed for advanced on-site systems maintenance | •VDH | 2002 | |
| 24.5 Continue to support demonstrations of innovative water quality septic system designs | •VDH •DEQ •Private business | Ongoing | |

| OBJECTIVE 25 | | | |
|--|--------------------------------|-------------|-----------------|
| <i>By the year 2005, develop mechanisms, framework and tracking systems in order to assess failing systems and actual pollutant loading</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 25.1 Provide mechanisms, framework and tracking systems in order to find solutions for failing systems | •VDH | 2005 | |
| 25.2 Implement solutions for prioritized failing areas through the assessment of actual and potential pollutant loadings | •VDH •DEQ •DCR •CBLAD | 2002 | |
| 25.3 Identify and implement a cooperative state agency approach for addressing waterborne pathogens | •VDH •DCR •CBLAD •DEQ | 2002 | |
| 25.4 Continue working with local governments to establish pilot programs to provide loans for septic rehabilitation | •DEQ •Local governments | Ongoing | CWSRF |
| OBJECTIVE 26 | | | |
| <i>By the year 2003, develop and present statewide on-site sewage disposal educational programs in cooperation with local governments</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 26.1 VDH, CBLAD, DCR and DEQ will develop an interagency work group to develop the content of joint statewide educational programs | •VDH •CBLAD •DCR •DEQ | 2001 | |
| 26.2 Interagency workgroup established in 27.1 will identify watersheds with priority pollutant concerns in order to prioritize initial educational efforts | •DCR •CBLAD •DEQ •VDH | 2001 | |
| 26.3 Educational programs will be developed and presented to local governments, developers, homeowners associations, contractors and citizens regarding the relationships between sustainable development and on-site waste disposal systems | •VDH •CBLAD •DEQ •DCR | 2003 | |

WORK GROUP MEMBERS & AGENCY/ORGANIZATION REPRESENTED



Construction & Development

Department of Conservation & Recreation Facilitators

Mr. Jake Porter
Mr. Joe Batiatta

Nonpoint Source Planning and Grants Program Manager

Mr. Rick Hill

Ms. Amy Anstey
Virginia Department of Transportation

Mr. Doug Beisch
Chesapeake Bay Local Assistance Department

Ms. Dawn Biggs
Virginia Lakes and Watersheds Association

Mr. Ernie Brown
Virginia Department of Conservation & Recreation

Ms. Ann Jennings
Chesapeake Bay Foundation

Mr. David Lazarus
Virginia Department of Environmental Quality

Mr. Victor Liu

Crater Planning District Commission

Ms. Mary-Ann Massie
Virginia Department of Environmental Quality

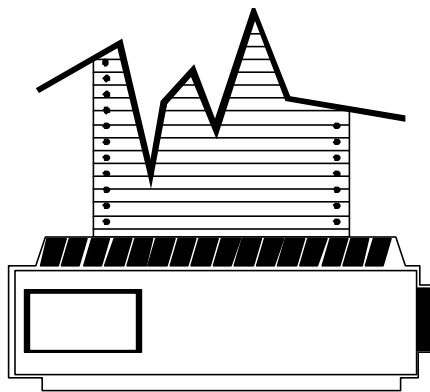
Mr. Duke Price
Virginia Department of Health

Mr. Mark Slauter
Virginia Department of Conservation & Recreation

Ms. Randy Slovic
Sierra Club

Mr. Hugo Valverde
Hampton Roads Planning District Commission

Mr. Stuart Wilson
Department of Conservation and Recreation



MONITORING AND TRACKING

LONG-TERM GOAL (15- YEAR)

The overall goal of Virginia's nonpoint source pollution monitoring and tracking programs is to support the development, implementation and evaluation of the nonpoint source pollution management program. Monitoring and tracking measure the effectiveness of the management program to ensure that the beneficial uses of Virginia's waters are attained and maintained

INTRODUCTION

Water quality monitoring and tracking nonpoint source pollution control implementation are essential elements of Virginia's Nonpoint Source Pollution Management Program. Monitoring and tracking support and direct program activities by providing information on water quality and the health of water resources. The Department of Environmental Quality (DEQ) administers the state ambient water quality monitoring programs. The Department of Conservation and Recreation (DCR) is the lead state agency for supporting and tracking nonpoint source (NPS) pollution control implementation. Both DCR and DEQ support citizen monitoring efforts in Virginia. Identifying water quality problems and the sources of impairment is a major focus of Virginia's water quality monitoring program.

Virginia's plan for NPS pollution monitoring and tracking activities identifies the roles and responsibilities of various state agencies and other organizations, and potential barriers to conducting a comprehensive program. The results are summarized in the narrative and tables that follow.

Federal and state laws and regulations identified in this chapter are listed at the end. A glossary of terms associated with monitoring, tracking and water quality activities can be found in another section of this document.

AGENCY ROLES & RESPONSIBILITIES

The two key state agencies fundamental to monitoring and tracking activities for Virginia are DEQ and DCR. In addition, several other state agencies provide support specific to their areas of responsibility and expertise. These agencies include the Department of Health; Department of Forestry; Department of Mines, Minerals and Energy; Department of Game and Inland Fisheries; the Chesapeake Bay Local Assistance Department; and the Virginia Cooperative Extension. Furthermore, three federal agencies provide support to the state's activities, U.S. Environmental Protection Agency (EPA), U.S. Geological Survey and Natural Resource Conservation Service. Coordination and communication between these state and federal agencies are maintained through

an interagency committee known as the Nonpoint Source Advisory Committee. This committee is coordinated by DCR. The major roles and responsibilities of these agencies are described below.

Department of Environmental Quality

The State Water Control Board was consolidated into the Department of Environmental Quality (DEQ) along with three other state agencies in 1993, and has had the responsibility for monitoring the quality of the state's waters since such activities began in the late 1950s. At the present time (May 1999), DEQ has more than 2000 monitoring stations, distributed throughout the estuarine and fresh waters of the commonwealth. As required by the Clean Water Act of 1987, water quality monitoring stations provide an ongoing characterization of water quality and data for the Section 305(b) and Section 303(d) Assessment Reports that are submitted to EPA and Congress. DEQ monitors a standard group of parameters including nutrients and related classes, toxic compounds with Water Quality Standards, benthic community, and many others as necessary to determine water quality. DEQ monitors various matrices including surface waters, sediment, fish tissue, ground water, and others to determine the overall water quality in streams, lakes, rivers, estuaries, wetlands, and open waters. The results of this monitoring are stored in EPA's national database (STORET) and are published at the end of each monitoring year (1 July to 30 June) as the Virginia (DEQ) Ambient Water Quality Monitoring Report.

Department of Conservation and Recreation

The lead NPS pollution control agency for Virginia is the Department of Conservation and Recreation (DCR). As such, it develops and implements all statewide NPS pollution control programs and services and coordinates the Nonpoint Source Advisory Committee (NPSAC). DCR is responsible for developing the state's NPS pollution assessment, a comparative evaluation of the state's waters on a watershed basis, to assist in targeting NPS pollution activities. As required by Section 319 of the Clean Water Act of 1987, the first statewide assessment was completed in 1988, with subsequent updates and refinements conducted periodically since that time. The assessment ranks the state's nearly 500 watersheds, based on land use,

animal density, forest harvesting, disturbed urban acres, best management practices (BMPs) implementation and other related factors, for NPS pollution potential. The rankings are used to direct the implementation of Virginia's NPS pollution control programs, as well as committing a significant portion of the state's nonpoint source grant funding to the most critical watersheds.

DCR also administers NPS pollution control programs required by state law. These programs include erosion and sediment control, stormwater management, nutrient management, agricultural BMPs, shoreline erosion control, floodplain management, dam safety, and public beach conservation, and provides the administrative, technical and financial support to soil and water conservation districts. DCR tracks implementation of these programs.

DCR addresses nonpoint source impacts to groundwater quality in the karst headwaters of the Shenandoah, James, Roanoke, and Upper Tennessee river basins in western Virginia through specific groundwater monitoring and source water assessment studies. DCR cooperates with VDH, DEQ, and the SWCDs in implementing these investigations.

Virginia Department of Health

The Virginia Department of Health (VDH) participates in several areas of NPS pollution monitoring and tracking. These include septic systems, source water protection, shellfish and human health advisories and alerts. VDH is the permitting authority for on-site sewage disposal systems in the commonwealth. The department generally does not require monitoring of on-site sewage disposal systems. Exceptions include experimental and proprietary systems, and discharging systems for single family homes. Private wells and public water supplies are regulated by VDH. Fulfilling the requirements of the federal Safe Drinking Water Act and amendments are a priority, as evidenced by the state's Source Water Assessment and Source Water Protection programs. The department monitors shellfish growing areas and regularly conducts surveys to identify contributors to pollution of these waters. VDH conducts limited recreational water monitoring in Norfolk and Virginia Beach, and the counties of Bedford, Franklin and Fairfax.

Regarding human health, VDH's activities include providing consultation and advice on issues of water-related health problems; investigating and responding to reports of illness related to exposure to water in Virginia; maintaining databases on water-related illness and water quality data; conducting epidemiologic studies to determine risk factors for waterborne illness; contributing to the development of water related policy, regulations and laws; and collaborating and coordinating with state and federal agencies and institutions to address waterborne problems. VDH list public health advisories incorporating data provided by DEQ's monitoring program.

Chesapeake Bay Local Assistance Department

In response to the Chesapeake Bay Preservation Act of 1988, the Chesapeake Bay Local Assistance Department (CBLAD) developed a set of land use regulations and policies. These land use regulations and policies are administered by local governments throughout Tidewater, Virginia, to protect water quality. The overall goal of the department's water quality monitoring program is to determine the efficacy of these regulations and policies in protecting water quality from the impacts of adjacent urban development activities. A comprehensive assessment of the effect of the regulations is being made through a 10-year interdisciplinary project initiated in 1993 and is located on Polecat Creek in Caroline County. The project is expected to provide basic water quality data and detailed information on the background state and the trends in water quality in response to the changes in land use/land cover and the implementation of local land use regulations. The quantity and quality of surface and ground waters, biological status of streams and land use changes are being monitored within the watershed. The information collected will be used to identify any trend in water quality, and to develop a water quality model to assess the impacts of various land use scenarios on water quality and on the biological indices of the streams.

Virginia Department of Forestry

The Department of Forestry (DOF) is responsible for tracking compliance over time with forestry BMPs and changes over time in pollutant loads from silvicultural

harvesting activities across the state. In fulfilling these responsibilities, DOF assesses the implementation and effectiveness of forestry BMPs and the sediment loads associated with silvicultural operations. DOF administers Virginia's Silviculture and Water Quality Law based on indications that sedimentation is exceeding normal amounts.

Virginia Department of Mines, Minerals and Energy

The Department of Mines, Minerals and Energy (DMME) administers state regulatory programs governing safety and reclamation on mineral resource extraction sites in Virginia. DMME also operates inventory and construction programs designed to identify and eliminate public safety hazards and pollution from abandoned coal and mineral mines, and gas and oil wells. DMME's mission is to enhance the development and conservation of energy and mineral resources in a safe and environmentally sound manner to support a more productive economy. Monitoring to evaluate pollutants and assess the success of reclamation efforts is a continuous component of DMME's reclamation programs.

Virginia Department of Game and Inland Fisheries

The Department of Game and Inland Fisheries (VDGIF) is responsible for managing the state's fish and wildlife resources including those associated with biotic environments. Part of that management includes comprehensive samples of the aquatic fauna and evaluation of its health. Biological information on fish and mussels is used to evaluate the impacts of NPS pollution and the benefits of programs that address this type of pollution.

Virginia Cooperative Extension

Virginia Cooperative Extension Service (VCE) coordinates the Farm*A*Syst and Home*A*Syst programs for the state. Both are voluntary self-assessment programs that can be used to evaluate environmental and health risks on a property with emphasis on protecting domestic water supplies. Under the Farm*A*Syst program, trained staff work with participating farm families to conduct an assessment of

their farm and provide assistance in making the necessary corrections to remedy any hazardous situation on the farmstead. The program is administered in cooperation with the USDA Natural Resource Conservation Service (NRCS). Home*A*Syst identifies environmental risks, concerns or problems in and around the home, provides information on better home and property management and recommends preventive actions to safeguard the homeowner's health and the surrounding environment.

ISSUE IDENTIFICATION & PROGRAM ASSESSMENT

Historically, Virginia has focused monitoring efforts on point source discharges. Although DEQ has relocated many of its monitoring stations and expanded its monitoring network to enhance ambient water quality data collection and support nonpoint source monitoring needs, the placement of monitoring stations continues to reflect a point source bias. A key challenge to Virginia monitoring programs will be to ensure that the location and design of monitoring stations reflect the increasing focus on reducing nonpoint sources of water pollution.

Lack of stream flow data, groundwater levels and quality of data, and data consistency have also been identified as significant monitoring issues. As Virginia moves forward with developing total maximum daily loads (TMDLs) for streams impaired by nonpoint sources of pollution, data consistency and the availability of flow data will be essential for analyses of pollutant load allocations.

EXISTING STATE MONITORING PROGRAMS:

Ambient Water Quality Monitoring Program

DEQ's *Ambient Water Quality Monitoring Network* contains more than 1,200 sampling stations. Samples are tested for a number of chemical and physical parameters to assess water quality throughout the commonwealth. Long term water quality trends can be determined from this monitoring program.

The *Virginia Biological Monitoring Program (VBMP)* is administered by DEQ's water division and consists of more than 200 stations within 116 hydrologic units (HUs). This program uses EPA's Rapid Bioassessment Protocol II habitat assessment technique to monitor benthic macroinvertebrates to classify water quality as nonimpaired, moderately impaired or severely impaired. These classifications are used to help determine if water quality meets the fishable goals of the Clean Water Act and the State Water Control Law.

The Chesapeake Bay Fall Line Monitoring Program

DEQ, in cooperation with the USGS, operates five fall line monitoring stations to characterize nutrient and sediment loads entering the Chesapeake Bay and Virginia's tidal tributaries (the James, Appomattox, Rappahannock, Mattaponi, and Pamunkey rivers). The objective of this monitoring program is to characterize nutrient and sediment loading to the Chesapeake Bay and the tidal portion of its tributaries originating in the James, Rappahannock and York river basins.

Samples from these stations are tested for nitrogen, phosphorus, carbon, inorganic sediments and silica. Samples are taken semi-monthly from base flow, and approximately 30 times a year during high flow periods. Sampling is conducted during both base flow and high flow periods in order to accurately characterize total loading entering the tidal rivers from the watershed above the sampling points. This total loading is composed of nutrients and sediment originating from both point and nonpoint sources in the watershed. Various methods (e.g. computer simulation models, land use information, examination of concentration/riverflow associations) are used to estimate the percentages of point versus nonpoint inputs.

The Chesapeake Bay Monitoring Program

Monitoring stations are located throughout the mainstem of Chesapeake Bay and the tidal portion of the James, Rappahannock, and York rivers. Sampling of water quality and biological conditions is conducted to characterize ecological status and trends in the Chesapeake Bay and Virginia's tidal tributaries. These ecological conditions are, to a large degree, influenced by inputs of nutrients originating from both point and nonpoint sources in the watershed. Samples are

routinely collected either semi-monthly, monthly or quarterly.

The Department of Forestry Water Quality Monitoring Program

DOF's water quality monitoring program began in 1990 as a part of the DOF NPS pollution reduction initiative. It combines chemical and biological monitoring with computer simulation modeling to produce insights into the characteristic and dynamic behavior of water in forest ecosystems. The program helps document the effects of timber harvesting on water quality. DOF monitoring is funded through an EPA grant administered by DCR.

EXISTING CITIZEN MONITORING PROGRAMS:

Alliance for the Chesapeake Bay's Virginia Citizen Monitoring Program:

The Chesapeake Bay Citizen Monitoring Program is a network of 140 volunteers in Maryland, Pennsylvania and Virginia that collects water quality data and information about the Chesapeake Bay and its tributaries. A quality assurance plan has been developed to ensure the precision and accuracy of data collected by its volunteers.

Since its inception in Virginia, in 1985, Virginia's program has grown substantially. Initially there were 16 sites on the James River. Now the program has grown to more than 120 volunteers on the James, York, Rappahannock, Potomac, Piankatank, Mattaponi, Pamunkey, Lynnhaven and Elizabeth rivers, as well as on the creeks and embayments of the Eastern Shore.

The parameters tested are air and water temperature, water depth and clarity, salinity, pH and dissolved oxygen. Monitors also record wildlife observations, field observations of water conditions and color, weather, precipitation and general conditions of the site. All monitors sample weekly throughout the year. According to DEQ program staff, there are approximately 400 citizen monitoring stations at this time. In 1992, a pilot nutrient sampling program began at eight sites and eight more sites were designated as Zebra Mussels Monitoring Stations.

The nutrient sampling program was implemented in conjunction with DEQ's water division. For this program, 10 sites were chosen in areas of submerged aquatic vegetation (SAV). Sampling results will be used to help evaluate present status and future trends of nutrient concentrations in SAV growing areas.

Data generated by this program is used to augment DEQ's mid-channel monitoring program. Citizen monitoring data are taken at near-shore sites and provide a means of analyzing the correlation between near-shore and mid-channel data. In 1992, citizen monitoring data were, for the first time, used to make assessments in Virginia's 305(b) report to Congress on the quality of the state's waters. The wildlife observations, which are recorded with the help of a field guide, provide input to the DGIF on sightings of common or ordinary species.

To better manage the expanded program and provide feedback to the volunteers, a data management software program, CitMon*MAN, was developed. The program was presented at the second annual Virginia Environmental Education Conference, third National Citizen Monitoring Conference and the Coastal Society Conference. Data from the field are collected, verified and entered by 10 volunteer Watershed Coordinators. The data is then imported to the central computer in the DEQ Richmond office where it is used to make individual tabular reports and graphs for monitors. This software makes available a standardized format for reporting volunteer water quality data to state agencies. All data are also sent to the Chesapeake Bay Program office in Annapolis, Maryland where files can be accessed by state agencies and other interested parties.

Izaak Walton League of America's Save Our Streams Program

The Izaak Walton League of America (IWLA) formally began the Save Our Streams (SOS) program in Virginia in 1988. The objectives of this program are:

- C to increase the state's ability to assess surface water quality;
- C to promote an awareness of the state's aquatic resources; and

- C to bring concerned citizens together to more effectively address water quality issues on a watershed level.

Funding for the SOS program has been provided, in the past, by grants from DCR and the Virginia Environmental Endowment. Biological monitoring data is collected by citizen volunteers at more than 240 stations across the state and sent to DCR as completed survey forms.

Virginia volunteers are trained to identify water pollution problems and to survey stream-dwelling organisms (macroinvertebrates) and various physical characteristics in order to determine stream health. Also, volunteers receive a SOS sampling kit that contains the equipment, references, and directions necessary to conduct biological monitoring. Volunteers adopt a freshwater stream with one or more monitoring points (stations) along the stream. Each station is generally monitored four to six times a year.

IWLA's biological monitoring is conducted in 71 of the state's 494 hydrologic units. The greatest spatial coverage is in the urbanized watersheds in Northern Virginia. The number of SOS monitoring stations in Eastern Virginia is very sparse. This is because the SOS monitoring protocol was initially designed for shallow, free-flowing freshwater streams and was not applicable to saltwater invertebrates or coastal plain streams that are dominated by pool habitats.

DCR is working with citizen groups to solicit volunteers in those watersheds that have received a high priority in the state's nonpoint source assessment ranking.

EXISTING BMP TRACKING PROGRAM:

Nutrient Management Plan Tracking Activities

Virginia's Nutrient Management Program has used a computer tracking and reporting system known as NMTRACK in several versions since 1989. The major items reported by the program include number of nutrient management plans completed, planned acreage, and nitrogen and phosphorus reductions achieved by plan implementation. Additional data were supplied on plan-related activities such as the number of manure

tests run, manure spreader calibrations, quick nitrate tests, test plots established and harvested, farmer contacts, media contacts, and presentations made.

The program was updated to accommodate reporting on expanded activities related to the accomplishment of specific goals within the program's strategic workplan. These items include nutrient management plan revisions, plans reviewed, plan follow-ups, plan development, sludge site reviews, cold calls to farmers (phone and personal), referrals received, nutrient industry contacts, media articles written, and nutrient management displays used.

Virginia Agricultural BMP Cost-Share Program Monitoring and Tracking

BMP implementation resulting from enrollment in the Virginia Agricultural BMP Cost-Share Program is tracked in a digital database. DCR uses the database to determine water quality improvements, to guide adjustments in program funding and administration, and to create random lists for program compliance spot checks. At the local level, soil and water conservation districts also use the BMP tracking information.

Soil and water conservation districts enter information regarding each request for cost-share assistance into local databases. Each district periodically uses the database to sort, target and rank requests for cost-share and approve funding for BMP implementation. The database allows districts to monitor local BMP implementation, local program funding status and to request disbursement of program funds from DCR. At the close of each quarter, districts submit a copy of their local databases to DCR for statewide compilation.

Hydrologic Unit Planning

DCR implemented a statewide Hydrologic Unit Planning (HUP) system, which divides the state into sub-watersheds of USGS cataloging units and identifies nonpoint source pollution water quality problems within these sub-watersheds. County hydrologic unit maps have been used to collect information on land use, livestock and poultry inventories, erosion rates, disturbed land, and sludge and fertilizer use within each watershed.

By prioritizing NPS pollution problems within the state, cooperating state agencies can optimize the use of funds made available for correcting nonpoint source pollution problems. The Virginia Agricultural Cost-Share Program continues to target funding based on these priorities.

Virginia Geographic Information System

VirGIS was developed by DCR and the Virginia Polytechnic Institute and State University (Virginia Tech) Department of Agricultural Engineering with contractual support from the Virginia Tech Information System Support Lab. VirGIS is a database used to track sources of NPS pollution and target limited management resources; however, VirGIS maps and data are made widely available for other uses.

OBJECTIVES (SHORT-TERM GOALS)

In order to achieve the overall goal as stated in the beginning of this chapter, seven objectives for the state's NPS pollution monitoring and tracking programs have been identified. These objectives, which are listed below, form the basis of a workplan for the implementation of a nonpoint source monitoring and tracking program.

In the context of these programs, **monitoring** refers to the physical, chemical and biological analyses of the various matrices; evaluation refers to the predictive measures of assessing potential NPS water quality impacts due to land use practices; and assessment refers to an evaluation of water quality based on monitoring data and land use practices. (For additional strategies, objectives, and tasks regarding implementation of monitoring and tracking management measures in the coastal zone refer to Chapter XIII Coastal Nonpoint Source Pollution Control Program.)

Objective 1. By 2001, evaluate the state's waters for NPS pollution related problems

The primary means to implement this objective will be the water quality programs implemented by DEQ, supplemented by water quality programs operated by

other state and federal agencies and those operated by voluntary citizen groups. Please note that biological assessments may contain elements of habitat assessment.

Objective 2. Evaluate the state's waters, on a watershed basis, for NPS pollution related problems for targeting NPS pollution prevention activities

This objective will be coordinated by DCR with the support of the other organizations noted in the tables utilizing their specialized areas of expertise and scholarship.

Objective 3. Coordinate with other public/private groups that contribute to the state's understanding of NPS pollution related issues

DCR will lead, but will coordinate extensively with DEQ to achieve this objective.

Objective 4. Prioritize watersheds based on the potential of adverse impacts due to NPS pollution

This objective is primarily directed by DCR. Additional strategy items may be added to this objective at any time at the discretion of DCR.

Objective 5. Determine the effectiveness of NPS pollution control projects, programs, or strategies across various geographical scales (river basin to watershed to site-specific)

DCR will serve as coordinating agency for this objective with the cooperation of DEQ, USGS and the other organizations within NPSAC.

Objective 6. Investigate and determine NPS pollution related contributions or potential contributions to groundwater statewide

Coordination for this objective will be handled by DCR under the direction of NPSAC.

Objective 7. Improve support and use of citizen monitoring resources

DCR and DEQ will jointly oversee this objective utilizing their respective departmental citizen monitoring coordinators.

The respective strategy items will be conducted by the specified agency (DCR or DEQ) with oversight by NPSAC. The two agencies will provide progress reports on their activities for this objective to NPSAC on a regular basis.

TABLES OF OBJECTIVES & STRATEGIES

In the following tables, each objective is more fully outlined and specific agency related strategies and tasks are identified to implement the objective.

| OBJECTIVE 1 | | | | |
|--|---|-------------------|-----------------------------------|-----------------|
| <i>By 2001, evaluate the state's waters for NPS pollution related problems</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 1.1 Continue efforts, within resource limitations, to develop an ambient, biological and chemical water quality monitoring system capable of portraying NPS pollution related characteristics for all watersheds, through proper distribution and monitoring frequency | | •DEQ •DCR | Ongoing | |
| 1.2 Provide ambient/chemical and biological water quality sampling, within resource limitations, for all watersheds defined by DCR as high priority for potential NPS water quality problems | Sampling frequency to be consistent with requirements for reporting compliance with water quality standards set forth in Section 305(b) | •DEQ •DCR | Ongoing - Approx. every two years | |
| | Coordinate the location of these stations, both chemical and biological, to ensure representative coverage | | | |

| | | | | |
|---|---|---|--------------------|-----------------|
| 1.3 Assess the chemical and biological water quality monitoring data collected | Provide information regarding waters not meeting applicable water quality standards to DCR | •DEQ •DCR | Ongoing | |
| | Use both chemical and biological data to more accurately assess water quality for the state's 303(d) list | | | |
| OBJECTIVE 1 (Cont.) | | | | |
| By 2001, Evaluate the state's waters for NPS pollution related problems | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 1.4 Determine potential sources of identified water quality impairments | | •DEQ | Ongoing | |
| 1.5 Evaluate additional monitoring technologies and objectives for addressing and identifying nonpoint sources of water pollution | To include limited use of probabilistic sampling design to determine statistically the extent of several key water quality indicators as a comparison to the results from DEQ's fixed station network | •DEQ •DCR | Begins 1999 - 2000 | |
| 1.6 Identify areas where enhanced monitoring is needed to better characterize actual or potential NPS pollution problems | Include priority NPS watersheds, karst areas and those areas that may be required to adopt agriculture pesticide management plans | •DCR •DEQ •Other state/ local agencies •Public/ private groups •VDACS | Ongoing | •General Fund |
| | Support fecal coliform typing research related to identification of fecal contamination sources | | | |

| | | | | |
|---|---|-------------------|---|-----------------|
| 1.7 Support research and demonstrations to better characterize the sources of fecal coliform water quality problems statewide | Efforts will be made to better communicate, coordinate and share information as it is developed and verified | •DCR •DEQ | 1999-2004 | •Grant funds |
| | Support fecal coliform typing research related to identification of fecal contamination sources | | | |
| OBJECTIVE 2 | | | | |
| Evaluate the state’s waters, on a watershed basis, for NPS pollution related problems for targeting NPS pollution prevention activities | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 2.1 Identify pollutant loading estimates to assess the watersheds of the state using NPS pollutant loadings by source category | Gather existing land use, animal population, soil characteristics, census data and land disturbance data on a watershed basis statewide | •DCR | 1999 | •General Fund |
| | Frequency to be consistent with the development and submittal of the 305(b) and 303(d) reports submitted to EPA | | | |
| 2.2 Integrate NPS pollution monitoring into the NPS watershed assessment through coordination of DEQ’s monitoring and tracking program data with DCR’s pollution potential rankings for NPS | Determine the association between monitoring station locations and watersheds being monitored | •DCR •DEQ | 1999 and thereafter prior to 305 (b) schedule | •General Fund |

| 2.3 Determine the miles of NPS impaired waters by watershed and use a derivation of the comparison of these results in the NPS pollution assessment process | | •DCR | 1999 and thereafter prior to 305 (b) schedule | •General Fund |
|---|--|---|---|------------------------|
| 2.4 Assess the state's 14-digit watersheds for NPS pollution characteristics in a manner similar to the federally approved process developed in the 1998 Unified Watershed Assessment and Restoration Priorities report of September 1998 | | •DCR | 1999 and thereafter prior to 305(b) schedule | •General Fund |
| OBJECTIVE 2 (Cont.) | | | | |
| <i>Evaluate the state's waters, on a watershed basis, for NPS pollution related problems for targeting NPS pollution prevention activities</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 2.5 Report on the assessment of watersheds by NPS pollution problems | DCR will publish as a component of 305(b) report | •DCR •DEQ | 2000 & every two years thereafter | •General Fund |
| | DCR will report assessment details in a separate NPS assessment report | | | |
| 2.6 Assist in the development or revision of the land use and land disturbance databases and in the development or revision of pollutant loading estimates where appropriate | | •State, federal and local political sub-divisions (to include SWCDs) & universities | 2001 | •General Fund |

| 2.7 Refine the pollutant loading assessment methodologies such that total loads of NPS pollutants (primarily nitrogen and sediment) can be quantified on a watershed basis statewide | Review existing loading estimation techniques | •DCR •DEQ | 2001 | •General Fund |
|---|--|-------------------|-------------|-----------------|
| | Evaluate nutrient and sediment transport processes | | | |
| | Develop a confined animal database | | | |
| | Investigate the use of imagery for more accurately determining the land cover by watershed | | | |
| OBJECTIVE 2 (Cont.) | | | | |
| Evaluate the state's waters, on a watershed basis, for NPS pollution related problems for targeting NPS pollution prevention activities | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 2.8 Refine the process of assigning credits to installed agricultural BMPs and nutrient management plans, so that the NPS pollutant load reductions realized from these practices can be subtracted from the measures of potential loadings from the data collected in the first strategy item under this objective | | •DCR | 2001 | •General Fund |

| 2.9 Continue to refine tracking system for disturbed acres as reported under the Virginia Erosion & Sediment Control Program | Gather additional sources of land disturbance data and incorporate this information into the assessment process | •DCR •VDOT | 1999-2001 | •General Fund |
|--|---|------------------------------|--------------------|------------------------|
| 2.10 Assess the pollutant loads associated with silvicultural operations and assess the effectiveness of BMPs | | •DOF | 1999-2001 | |
| 2.11 Assist in basin level assessment of NPS pollutant loadings through ongoing NAWQA and other studies | DEQ will provide flow data as resources allow to calculate loadings | •USGS •DEQ | Ongoing | |
| OBJECTIVE 2 (Cont.) | | | | |
| <i>Evaluate the state's waters, on a watershed basis, for NPS pollution related problems for targeting NPS pollution prevention activities</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 2.12 Continue to provide information on permitted dischargers, including sewage treatment plants (STPs) that could aid in the assessment of NPS pollutant loadings in impaired streams | | •DEQ | Ongoing | |

| | | | | |
|---|--|-------------------------------------|---------|---|
| 2.13 Add an impact due to failing septic systems into the watershed assessment process | Form an interagency committee to explore the potential problem of deteriorated or leaking septic systems, especially in the context of their impact on impaired streams and other water bodies | •DEQ •VDH •DCR | 2003 | •Unknown |
| 2.14 Support research and demonstration projects to develop, verify and refine NPS pollution loading estimates for various nonpoint sources | Evaluate models developed and used to account for septic loadings in other states Evaluate and adjust monitoring parameters to more accurately define potential NPS problems | •DCR •State and federal agencies | Ongoing | •General Fund •Grant Funds where appropriate |
| 2.15 Conduct and support research and demonstrations related to assessing pollutant loadings generated by silvicultural activities | | •DOF | | |

| OBJECTIVE 3 | | | | |
|---|--|-------------------|-------------|-----------------|
| <i>Coordinate with other public/private groups that contribute to the state's understanding of NPS pollution related issues</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 3.1 Conduct a survey of known public/private groups that conduct and/or support NPS monitoring activities within the state | Where a relationship would be beneficial to both parties, explore the possibility of formalizing the relationship with a memorandum of understanding | •DEQ •DCR | 2000 | |

| | | | | |
|--|---|-------------------------|------|---------------|
| 3.2 Survey and identify existing academic research (and researchers) of potential importance to NPS pollution monitoring programs | Integrate these efforts into state programs | •DEQ | 2000 | |
| | Continue and expand efforts that assist NPS pollution monitoring | | | |
| 3.3 Contact universities and colleges located within the state that conduct research or education activities that increase the understanding of NPS pollution and control measures | Convene a meeting with the appropriate institutions to discuss the state's research needs regarding NPS pollution | •DCR •State agencies | 2000 | •General Fund |

| OBJECTIVE 4 | | | | |
|---|---------------|-------------------|--|-----------------|
| <i>Prioritize watersheds based on the potential of adverse impacts due to NPS pollution</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 4.1 Incorporate individual ranking components and a measure of the level of heritage resources within each watershed that are threatened by NPS impairments | | •DCR | 1999 & following every watershed assessment thereafter | •General Fund |

| | | | | |
|---|--|--------------|------|---------------|
| 4.2 Add a measure of the threat to human health caused by NPS water quality impairments as a means of prioritizing watersheds | | •DCR •VDH | 2001 | •Unknown |
| 4.3 Complete a scenic rivers designation component to prioritizing watersheds within their assessed rankings | | •DCR | 2000 | •General Fund |

| OBJECTIVE 5 | | | | |
|--|---|-------------------|-------------|-----------------|
| <i>Determine the effectiveness of NPS pollution control projects, programs or strategies across various geographical scales from river basin to watershed to site-specific</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 5.1 Ensure that each watershed implementation project funded with federal or state dollars includes components that will document the environmental benefits | Wherever feasible, based on geographical and/or temporal scale, these benefits will be measured in terms of physical, chemical and/or biological improvements | •DCR | Ongoing | •Grant Funds |

| 5.2 Provide for monitoring and other technical assistance to measure the success of watershed implementation projects | | <ul style="list-style-type: none"> •DEQ •State and federal agencies •Citizen monitoring groups | Ongoing | |
|--|---|---|--------------------|---|
| 5.3 Support monitoring and other research studies to assess the effectiveness of individual BMPs and other control strategies particularly for new and innovative technology where effectiveness data is not available | Where applicable, the state will utilize information collected by other jurisdictions and organizations to supplement its evaluation of BMPs and other control strategies | <ul style="list-style-type: none"> •DCR •State and federal agencies | Ongoing | <ul style="list-style-type: none"> •Grant Funds •General Fund |
| 5.4 TARGET YEAR Section 319 funding for monitoring the effectiveness of new and innovative BMP strategies | | <ul style="list-style-type: none"> •DCR •NPSAC | 2000 | •Grant Funds |
| 5.5 Continue implementation of the Chesapeake Bay Tributary Monitoring Program to measure the long-term effectiveness of point and NPS pollution programs within the Chesapeake Bay basin | | •DEQ | Ongoing | •Bay Grant |
| OBJECTIVE 5 (Cont.) | | | | |
| <i>Determine the effectiveness of NPS pollution control projects, programs or strategies across various geographical scales from river basin to watershed to site-specific</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 5.6 Support other basin wide monitoring efforts to better characterize NPS loadings and the success of implementation programs in high priority NPS pollution basins | | <ul style="list-style-type: none"> •DEQ •DCR | 2000 | |

| | | | | |
|---|--|--------------------------------------|-----------|--------------|
| 5.7 Continue the Polecat Creek watershed study to determine the efficacy of existing land use regulations and policies in protecting adjacent water quality during urban development activities | Monitor the quality and quantity of surface and ground waters, biological status of the streams and changes in land use/land cover | •CBLAD •DCR | 1993-2003 | •Bay Grant |
| | Continue water quality data analysis and model development to investigate the impacts of land use changes on water quality | | | |
| | If trend monitoring stations detect apparent relationships between development activities on adjacent land and pollution loadings in surface and ground waters, CBLAD will seek funding to conduct special short-term projects to attempt to confirm and quantify such relationships | | | |
| 5.8 Support research and demonstrations to assess water quality problems related to plasticulture agricultural production, particularly on the Eastern Shore | Develop a plasticulture BMP handbook to provide appropriate technical information | •DCR •NRCS •SWCDs •VDACS | 2000-2001 | •Grant Funds |
| 5.9 Continue the implementation of basin-wide NAWQA studies on the Potomac River basin, Albemarle-Pamlico Drainage basin, Upper Tennessee River basin and the Kanawha/New River basin | Integrate the results of these studies into ongoing NPS assessment and implementation programs | •USGS •State and federal agencies | Ongoing | |

| OBJECTIVE 5 (Cont.) | | | | |
|--|---------------|-------------------|-------------|-----------------|
| <i>Determine the effectiveness of NPS pollution control projects, programs or strategies across various geographical scales from river basin to watershed to site-specific</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |

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|--|--|----------------------------------|---------|---------------|
| 5.10 Continue to use the statistical model ESTIMATOR to calculate loads of nutrients and suspended solids from the nine major tributaries of the Chesapeake Bay near the fall line and at selected other water quality monitoring stations in the Chesapeake Bay Basin | Evaluate model results to gain insight into the relationship between water quality, streamflow and season | •USGS •Chesapeake Bay Program | Ongoing | |
| | Continue to supply data on nutrient and sediment loads estimated at the fall line stations to the Chesapeake Bay Program | | | |
| | Assess trends at the fall line to measure upstream progress toward nutrient reduction goals | | | |
| 5.11 Continue to support efforts of the Tennessee Valley Authority (TVA) to monitor and assess NPS problems and control objectives in the upper Tennessee basin | | •NPSAC •TVA | Ongoing | •General Fund |
| 5.12 Incorporate methods to assess the effectiveness and implementation of the Chesapeake Bay Tributary Strategies | | •DCR •DEQ | Ongoing | •Bay Grant |

| OBJECTIVE 6 | | | | |
|--|---------------|-------------------|-------------|-----------------|
| <i>Investigate and determine NPS pollution related contributions or potential contributions on groundwater statewide</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |

| | | | | |
|---|--|--|--------------------|--|
| 6.1 Support research and demonstration projects to assess NPS pollution effects on groundwater resources statewide | | •DCR | Ongoing | •319 Grant •Other available funding |
| 6.2 Implement pesticide-specific ground water management plans, if final federal regulations are promulgated and sufficient funding is received | | •VDACS •NPSAC | Pending | •Grant Funds |
| 6.3 Make groundwater monitoring a component of watershed implementation projects, particularly in areas known to be susceptible to groundwater pollution | | •DCR | 2000-2001 | |
| 6.4 Continue to support education, research and demonstration projects related to ground water protection in karst regions of the state | | •DCR | Ongoing | •General Fund •Grant Funds |
| 6.5 Continue to research, demonstrations and educational activities to better characterize the interconnectedness of ground and surface waters and related pollutant transfer mechanisms | | •DCR •State and federal agencies | Ongoing | •General Fund •Grant Funds |
| 6.6 Continue the groundwater component of Polecat Creek Project | Monitor the quality and quantity of ground water resources under different land use and hydrogeologic conditions | •CBLAD •USGS | Ongoing | •Bay Grant |
| 6.7 Promote the development and utilization of the FARM*A*SYST and HOME*A*SYST programs | | •VCE •NPSAC | Ongoing | |
| 6.8 Interpret the findings of the ground water component of the NAWQA studies in Virginia and help integrate the findings into ongoing NPS pollution assessment and implementation programs | | •USGS •State and federal agencies | Pending | |
| OBJECTIVE 7 | | | | |
| <i>Improve support and use of citizen monitoring resources</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |

| | | | | |
|---|--|--|------------------------------------|--|
| 7.1 Establish a formal procedure to provide technical expertise and training to citizen monitoring groups to enhance their effectiveness and capabilities to provide water quality information which can be directly integrated into NPS pollution assessment and implementation activities | Upon request, agencies will provide available information specific to a particular watershed to give monitoring groups guidance on how to prioritize methods in a study design that provides maximum benefit to the commonwealth | •DEQ •DCR •Citizen monitoring groups | January, 2000 | |
| 7.2 Develop acceptable quality assurance/quality control program and project plans to ensure the validity of data collected by citizen monitoring groups | Establish a review process for the approval of quality assurance/quality control program and project plans. | •DEQ •DCR •Citizen monitoring groups | January, 2000 | |
| 7.3 Continue to integrate citizen monitoring information into the 305 (b) report | | •DEQ | Ongoing | |
| 7.4 Citizen data collected under state or federally approved quality assurance plans will be used to identify potential water quality impairments | This data will provide direction for future monitoring to potential NPS problem areas | •DEQ •Citizen monitoring groups | Starting with April 1, 2000 report | |
| 7.5 Support the use of citizen monitoring to assess the effectiveness of water quality implementation projects | | •DCR | Ongoing | |
| 7.6 Continue to provide monitoring coordinators who can provide oversight, education and assistance to citizen monitoring groups | Memorandum and letters of agreement will be developed and signed by state agencies and citizen monitoring groups | •DEQ •DCR •Citizen monitoring groups | Ongoing | |

OBJECTIVE 7 (Cont.)

Improve support and use of citizen monitoring resources

| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
|---|---------------|--|---------------------------------|--------------------|
| 7.7 Continue to support educational outreach opportunities to exercise awareness by citizens of all ages to the sources and effects of nonpoint and point source pollution and our state's water quality assessments, including TMDL and other state programs | | •DEQ •DCR •Citizen monitoring groups | Ongoing | |
| 7.8 Review any agreement that the agencies have entered into with citizen monitoring groups | | •DEQ •DCR | Annually, beginning summer 1999 | |
| 7.9 Enhance procedures for submittal of citizen monitoring data to agencies | | •DEQ •DCR •Citizen monitoring groups | 2000 | •Section 319 Grant |

STATE STATUTES AND REGULATIONS

Various laws and regulations apply to the state's monitoring, tracking, and related supporting activities. The specific state citations are provided below:

Ground Water Management Act of 1992 (*Code of Virginia* §62.1-254 et. seq.)

Toxics Reduction in State Waters of 1997 (*Code of Virginia* §62.1-44.17:2 et. seq.)

State Water Control Law (*Code of Virginia* §62-42)

Water Quality Improvement Act of 1997, as subsequently amended (*Code of Virginia* §10.1-2117 et. seq.)

Water Quality Monitoring, Information and Restoration Act of 1997, as subsequently amended (*Code of*

Virginia §62.1-44.19:4 et. seq.)

FEDERAL LAWS AND REGULATIONS

Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act of 1977, and as subsequently amended (33 U.S.C. 1251 et. seq.)

Safe Drinking Water Act of 1974, as subsequently amended (42 U.S.C. 300f et. seq.)

Chesapeake Bay Agreement of 1987, as amended in 1992 and including all directives signed by the programs's Executive Council.

WORK GROUP MEMBERS & AGENCY/ORGANIZATION REPRESENTED



Monitoring & Tracking

Department of Conservation & Recreation Facilitator
Ms. Diane McCarthy
Nonpoint Source Planning and Grants Program Manager
Mr. Rick Hill

Mr. Samuel Austin
Department of Forestry

Mr. Mark Bennett
Department of Conservation and Recreation

Mr. Allen Bishop
Department of Mines, Minerals and Energy

Ms. Stacey Brown
Department of Environmental Quality

Mr. Leith Campbell
Natural Resources Conservation Service

Mr. Ting Dai
Virginia Institute of Marine Science

Mr. Jay Gilliam
Izaak Walton League of America

Dr. Ram Gupta
Chesapeake Bay Local Assistance Department

Dr. Robert Hale
Virginia Institute of Marine Science

Ms. Jody Johns
Department of Conservation and Recreation

Mr. John Kauffman
Department of Game & Inland Fisheries

Mr. Michael Lewis
U.S. Geological Survey, Water Resources Division

Mr. Charles Lunsford
Department of Conservation and Recreation

Mr. Charles Martin
Department of Environmental Quality

Ms. Pamela Mason
Virginia Institute of Marine Science

Ms. Patricia Miller
Department of Conservation and Recreation

Mr. Shep Moon
Chesapeake Bay Local Assistance Department

Mr. Ron Ohrel
Center for Marine Conservation

Mr. Timothy Ott
Department of Conservation and Recreation

Mr. William Perkinson
Hercules, Inc.

Ms. Kary Phillips
Shenandoah Valley Pure Water 2000

Ms. Lisa Scafidi
Center for Marine Conservation

Ms. Kay Slaughter
Southern Environmental Law Center

Ms. Randy Slovic
Sierra Club

Mr. Donald Smith
Department of Environmental Quality

Mr. Roger Stewart
Department of Environmental Quality

Mr. Wilmer Stoneman
Virginia Farm Bureau Federation

Mr. Stuart Wilson
Department of Conservation and Recreation

Mr. Scott Wolff
Hercules, Inc.

RESOURCE EXTRACTION



LONG-TERM GOAL (15 YEARS)

To improve surface and ground water quality in watersheds throughout the Commonwealth of Virginia by reducing nonpoint source pollution associated with abandoned and orphaned resource extraction sites in 20 - 25 sub-watersheds for the purpose of obtaining designated uses. This can be accomplished through proper site planning, implementation of best management practices, acid mine drainage remediation and land reclamation activities in associated high priority watersheds or areas with identified impaired stream segments.

INTRODUCTION

The Virginia General Assembly determined that uncontrolled resource extraction activities in Virginia, from the mining of coal and non-fuel minerals and the extraction of gas and oil, can contribute several pollutants to water resources. Legislation was passed to regulate these activities. Discussion of these laws will follow. Resource extraction activities are broken into three subcategories; coal mining, gas and oil, and mineral mining. The pollutants associated with each are as follows:

- C Coal Mining: ground water impacts, heavy metal contamination, manganese, iron, sulfate, total suspended solids (TSS), acid mine drainage, erosion and sediment, and impacts on biota;

- C Gas and Oil: ground water impacts, TSS, erosion from land disturbance, and impacts from access roads; and

- C Mineral Mining: ground water impacts, total suspended solids (TSS), acid mine drainage, erosion and sediment, impacts on biota, heavy metal contamination, and pH levels (ambient as well as site discharge).

Additionally, material exposed by mining may also react with air contributing to acid mine drainage.

On all active mining sites, all water discharges (including surface and ground water discharges) must flow through a National Pollutant Discharge Elimination System

(NPDES) permitted discharge point, and is by definition a point source, and therefore, not a factor in the Nonpoint Source (NPS) Pollution Management Program. No point source discharges are allowed from gas or oil well sites in Virginia. Operators of active mines and well sites are required by state law to implement management practices that control the release of sediment from the site and meet current state and federal effluent standards for point source discharges. These active sites also must be reclaimed to a stable condition once the resource extraction activity is complete. However, many resource extraction sites ceased operation before laws requiring reclamation existed, and fall into the realm of NPS pollution.

Water quality issues are addressed through a permit process requiring that a performance bond be furnished by the permittee to insure that final reclamation of the mine or well site is completed. The permit process for all resource extraction sites requires the operators to submit an Operation and Reclamation Plan as an integral part of the permit application. The Operation and Reclamation Plan consists of four major elements:

- C a description of the method of operation;
- C a description of the drainage system with appropriate design data;
- C a reclamation schedule including a description of intended use; and
- C maps illustrating the total area to be permitted.

The Operation and Reclamation Plan must be designed to minimize the adverse effects on the environment and to facilitate integration of reclamation with the mining operation. All sites with active ground disturbances are inspected for reclamation at least twice annually to ensure compliance with state laws and regulations.

The focus of this chapter is the NPS pollution associated with resource extraction activities that arises from abandoned coal operations, orphaned mineral mines, and gas or oil well sites. These sites were not subject to current regulatory requirements and operated without having to meet the NPDES effluent standards. Abandoned and orphaned sites can remain unvegetated for 100 years after extraction activities have ceased and represent the primary source of NPS pollution from mineral, gas and coal extraction.

The definition of abandoned mines refers to coal mines abandoned prior to the Surface Mining Control and Reclamation Act (SMCRA) of 1977. Orphaned mineral mines are defined as those areas disturbed by the mining of minerals, not including coal, which were not required by law to be reclaimed or have not been reclaimed. Orphaned wells are those gas or oil wells that were abandoned prior to the enactment of current laws requiring reclamation.

The potential for NPS pollution impacts of abandoned and orphaned mines on state waters is significant. Erosion and sedimentation can destroy aquatic habitat and ruin stream channels. Acid mine drainage (low pH), and the corresponding heavy metal contamination, can significantly impair the ability of a stream to support biota, killing plants and animals that cannot withstand low pH levels. Ground water contamination from abandoned and orphaned mines and wells is also a concern due to fracturing and open pathways for pollutants to enter an underground aquifer. These impacts are remediated through reclamation activities on nonpermitted sites.

ISSUE IDENTIFICATION & PROGRAM ASSESSMENT

This section describes the regulatory process, reclamation, research education and technical assistance, and funding needs regarding NPS issues and the programs in place to address the issues.

The Department of Mines, Minerals, and Energy (is the primary state agency that regulates the resource extraction industry in Virginia. The DMME's Divisions of Mined Land Reclamation, Gas and Oil, and Mineral Mining deal directly with NPS pollution by conducting reclamation activities.

There are five categories of prioritization that define the degree of hazard to human health and safety, and impacts to the environment from abandoned coal mine lands (AML). The most serious AML problems are those posing a threat to health, safety and general welfare of the people and are considered to be "high priority." These are categorized as Priority 1 and 2. States are required by federal law to reclaim these two types before moving to lower priorities. Problems associated

with Priority 1 and 2 sites include clogged streams, dangerous impoundments, hazardous recreational water body, and polluted water for agricultural, industrial or human consumption. The Priority 3 designation focuses on problems known to be associated with the environment and includes waste dumps, equipment and facilities, haul roads, slurry, and runoff.

Priority 4 problems include the adverse effects of coal

mining practices on the protection, repair, replacement, construction, or enhancement of public facilities such as utilities, roads, recreation, and conservation facilities. Priority 5 involves the development of publicly owned land adversely affected by coal mining practices, including land acquired as provided in SMCRA for recreation and historic purposes, conservation, reclamation and open space benefits.

SOURCE CATEGORIES

| INACTIVE SITES SOURCE CATEGORY | POLLUTANT CATEGORY | | |
|--------------------------------|------------------------|--------------|---------------|
| | TOTAL SUSPENDED SOLIDS | HEAVY METALS | LOW pH LEVELS |
| Gas and Oil | T | | |
| Mineral Mining | T | T | T |
| Coal Mining | T | T | T |

Regulatory Process

DMME Division of Mined Land Reclamation

DMME's Division of Mined Land Reclamation (DMLR) administers the state law and regulations pertaining to coal surface mining reclamation and related water quality issues in the Commonwealth of Virginia. The primary law regulating these activities is Virginia's Coal Surface Mining Control and Reclamation Act, Chapter 19 of Title 45.1 of the *Code of Virginia*, and attendant regulations. At present, there are approximately 60,000 acres under permit on 657 coal mines in southwest Virginia. The main issues with coal mining are total suspended solids (TSS), heavy metal contamination (manganese, iron, sulfate) and impacts on biota from low pH levels due to acid mine drainage.

Each permit includes standards for ground water protection, water quality, public notification, and soil and erosion control. DMLR conducts regular inspections to

determine compliance during site construction, production, reclamation and final abandonment. Production records are submitted and maintained at the DMLR office.

DMME Division of Gas and Oil

The authority to manage the gas and oil industry is found in Virginia's Gas and Oil Act, Chapter 22.1 of Title 45.1 of the *Code of Virginia*, and attendant regulations. This legislation requires that each gas and oil operation meet standards for environmental protection, public safety, and resource conservation. The DGO regulates permitting, development, operation and reclamation of gas wells, oil wells, gathering pipelines, compressor stations, and associated facilities. The main NPS pollution issues for gas and oil well are groundwater impacts and TSS from land disturbance erosion, and impacts from access roads.

Each operating permit includes standards for

groundwater protection, water quality, public notification, and soil and erosion control. DGO conducts regular inspections to determine compliance during site construction, drilling, production, reclamation and final abandonment. Production records are also submitted and maintained at the DGO office.

At the end of 1998 Virginia had 1,036 conventional wells, 1,342 coal bed methane wells and 10 wells permitted for both conventional and coal bed methane production in southwest Virginia.

DMME Division of Mineral Mining

DMME's Division of Mineral Mining (DMM) provides for the safe and environmentally sound production of Virginia's non-fuel minerals. The primary law regulating these activities is the Mineral Mining Law, Chapter 16 of Title 45.1 of the *Code of Virginia*, and attendant regulations. Statewide, there are 493 non-fuel mines covering approximately 68,000 acres that are permitted and inspected by the DMM. These include quarries, sand and gravel pits, and other surface and underground mining operations. The main NPS pollution issues for mineral mining are TSS, heavy metal contamination and low pH levels from acid mine drainage. Mineral mining operations are not clustered in any one area but located throughout Virginia.

A large portion of the minerals mined in Virginia are extracted for the construction of roads and commercial and residential buildings. Additionally, other minerals are used for agriculture, high temperature ceramics and glass making.

Department of Environmental Quality

Virginia's Department of Environmental Quality (DEQ) regulations require all owners and operators of nonmetallic mining operations to apply for coverage under a Virginia Pollution Discharge Elimination System (VPDES) General Permit Regulation for Nonmetallic Mining (VR 680-14-21). The general permit covers processed water and mine pit dewatering associated with activities classified as nonmetallic mining industry.

The effluent limitations and monitoring requirements set forth in the general permit include monthly measurements of the average and maximum point

source flow and testing the effluent for total suspended solids (TSS) and pH from a grab sample once every three months. The DEQ director may require every permittee to conduct additional water quality monitoring to determine the effect of the pollutant(s) on the water quality, to prevent pollution of state waters and to satisfy the requirements of the Virginia State Water Control Law, the Clean Water Act and other DEQ regulations.

Chesapeake Bay Local Assistance Department

The Chesapeake Bay Local Assistance Department (CBLAD) provides assistance to 84 Tidewater local governments in developing, adopting and implementing local programs to protect water quality through the Virginia Chesapeake Bay Preservation Act (the Act - §10.1 - 2100 et seq., *Code of Virginia*) and the Chesapeake Bay Preservation Area Designation and Management Regulations (9 VAC 10-20-10 et seq., *Virginia Administrative Code*). The local Bay Act regulations supplement existing land use ordinance requirements and include the requirement for designation of Resource Protection Areas along tidal shorelines, tributary streams, and tidal and nontidal wetlands. Land use in the RPAs is limited to water dependent facilities and redevelopment activities. Any other activities, such as mining operations, are not permitted by right in the RPA and such land uses should be considered by the local government on a case-by-case basis.

Virginia Marine Resources Commission

Submerged Lands Management Program
(Sec. 28-2-1200 through 28.2-1213 of the *Code of Virginia*)

The Virginia Marine Resources Commission (VMRC) administers the Submerged Lands Permitting Program throughout the state. In non-tidal areas this program includes waterways with flows greater than five cubic feet per second (CFS) or drainage areas greater than five square miles.

Permits are issued through a joint permit review process involving local, state and federal agencies. Permits are reviewed based on compliance with statutory requirements and *Subaqueous Guidelines* as well as technical assistance provided by cooperating state and

federal agencies. Technical assistance comments are received from DEQ, DCR, Department of Health (VDH), and DGIF. Impacts on water quality, water quantity, habitat and aquatic resources, as well as affects on adjacent properties, are considered during permit review. BMPs are included in permits when applicable, as are requirements for minimum flows and provisions for continued fish passage. When applicable, permits can also require compliance with erosion and sediment control practices described in the *1992 Virginia Erosion and Sediment Control Handbook*.

Local Governments

Local governments are responsible for developing and implementing comprehensive plans and local growth strategies. As such, the local jurisdictions are responsible for ensuring that mining operations are compatible with current and future land use. Local governments have a variety of options through local ordinances and codes to address compatible land use, water quality issues and erosion and sediment control. The Richmond Regional Planning District Commission (RRPDC) presented an analysis of local government management considerations for borrow pit operations for the Richmond area in the report *Sand and Gravel Resources: Local Options for Protection and Regulation* (November, 1989). The report presents five options available to localities to regulate sand and gravel operations through zoning:

- C prohibit sand and gravel mining in all or parts of the jurisdiction;
- C include sand and gravel mining as a permitted use in one or more existing zoning districts;
- C establish a surface mining district;
- C create a mining overlay district; and
- C allow mining in one or more existing zoning districts by the use of special zoning such as a special exception or conditional use permit.

Special conditions are typically placed on the mining operation based on issues and concerns raised about each particular site.

The Hampton Roads Planning District Commission

(HRPDC) has presented a similar analysis in the report *Borrow Pit Management Strategy Study* (January, 1996).

Ad-Hoc Remining Task Force

Reclamation of abandoned coal mines could be greatly accelerated through remining. Currently, DMLR is working with EPA through the Interstate Mining Compact Commission (IMCC) Remining Task Force to develop best management practices (BMPs) on remining coal mine sites that have existing acid mine drainage (AMD). The goal of the Remining Task Force is to have the effluent limitations on these sites reduced or eliminated if BMPs are implemented. At this time, Virginia is supplying data to EPA that shows BMPs are successful in the reduction of AMD discharge if they are properly installed. The goal of the project is to encourage operators to remine areas that they would not otherwise mine because of an AMD problem. The implementation of a BMP, or suite of BMPs would replace the effluent numeric limits. EPA has agreed that the NPDES regulating authority in each state may implement an experimental program to use BMPs for gathering data for a regulation change that EPA is considering.

Reclamation

DMME Division of Mined Land Reclamation

The Division of Mined Land Reclamation (DMLR) administers the state law and regulations pertaining to coal surface mining and reclamation and related water quality issues in the Commonwealth of Virginia. DMLR's Abandoned Mine Land Section (AML) reclaims mines abandoned prior to the Federal Surface Mining Control and Reclamation Act of 1977. Funds for reclamation projects come from a per-ton tax paid by coal mine operators. The AML program has reclaimed hundreds of abandoned sites at a cost of approximately \$57 million since the program started in 1981. These sites have featured problems such as dangerous highwalls, landslide-prone areas, abandoned mine openings, burning refuse, hazardous structures, and mine subsidence.

The Abandoned Mined Land (AML) Program in Virginia prioritizes abandoned coal mine sites for reclamation. There are five priority classifications with Priority 1

being the highest. First consideration is given to Priority 1 or 2 sites where public health and safety and the general welfare are endangered from the abandoned sites. States are required by law to reclaim all sites classified as Priority 1 or 2 before reclaiming Priority 3, 4, and 5 sites. Virginia's AML Inventory has identified 400 high priority problem areas. A problem area may have several features. Using inventory data on the total estimate to reclaim Priority 1, 2, and 3 problem areas and the amount already expended, it would take DMLR 128 years to reclaim all of the problems areas. This figure is skewed, however, by the amount of money required to reclaim Priority 3 (environmental hazard) areas, some of which could be reclaimed through reining. Omitting Priority 3 sites, it will take 50 years to complete the reclamation of Priority 1 and 2 problems at the current level of funding.

DMME Division of Mineral Mining

The enactment of non-fuel mine safety and reclamation laws recognized that, while providing needed resources for development, uncontrolled mining could result in safety and environmental hazards. Virginia's Orphaned Land Program was enacted in 1978 to alleviate the environmental and public health and safety hazards associated with abandoned mineral mine sites.

The Orphaned Land Advisory Committee is composed of individuals from DMM, mineral mining industry, Virginia Polytechnic Institute and State University (VPI&SU), the Virginia Department of Transportation, DEQ, the USDA Natural Resources Conservation Service, private citizens, and the Virginia Aggregates Association. This Committee assists DMM in evaluating sites and prioritizing reclamation activity.

There are approximately 3,000 orphaned mineral mines throughout Virginia. To date, 73 reclamation projects have been completed encompassing 560 acres of eroded and unstable lands at a cost of \$2.25 million. In 1996 a new protocol was developed to inventory orphaned mineral mines identified as DCR NPS pollution high priority watershed designations. The intent is to integrate orphaned mineral mines data into the NPS pollution prioritization system along with agriculture, urban development and forestry data. Approximately three to six sites are reclaimed annually.

DMME Division of Gas and Oil

The Virginia Gas and Oil Act established Virginia's orphaned well program. The program requires a \$50 payment for every permit application submitted. These fees are placed into a fund, which is used to plug and reclaim the orphaned well sites. Currently, Virginia has identified approximately 70 orphaned wells. 1999 is the first year the DGO has been able to plug orphaned wells. To date, three have been completed at a cost of \$51,000. Wells are plugged to prevent oil or gas from migrating into water zones, mines, caverns, and to prevent interaction with drinking water supplies.

Research, Education and Technical Assistance

Virginia Cooperative Extension

Virginia Cooperative Extension (VCE) is involved in resource extraction pollution remediation through its Powell River Project. This is an applied research project and education effort of VCE to benefit the people, industries and governments of the Virginia coal region. The Powell River Project team sponsors and conducts research that develops cost-effective environmental protection practices for use by the coal industry. This is accomplished through cooperation with DMLR, the federal Office of Surface Mining (OSM) and the Virginia coal industry. Funding is provided by the state, through VPI&SU and VCE, and the coal industry. Topics addressed include revegetation of mine areas, and treatment and renovation of mine water discharges. VCE conducts educational programming to inform the coal industry, local governments and citizens in Virginia's coal-mining area about improved land reclamation and water quality protection technologies that have been developed through research. The programming also provides guidance in the application of research-based technologies. This information is made available to non-coal mining industries in other parts of the state.

Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS),

formerly the Soil Conservation Service, has not received federal funding for the Rural Abandoned Mine Program (RAMP) program for the last three years. NRCS is presently completing the remaining sites in its inventory and should have the last site finished in 1999. A partnership agreement for the reclamation of the Guest River Watershed in Wise County, Virginia, is currently pending between NRCS and DMME's AML program. Although NRCS may not have the RAMP funds restored in future budgets, it supports all reclamation efforts in Virginia. NRCS will continue to provide soil survey and BMP information for all pending sites as well as those under construction. NRCS will continue to provide personnel and expertise to help the soil and water conservation districts (SWCDs), OSM and DMME to prioritize potential sites. NRCS will continue to review and make technical and BMP recommendations to all other agencies addressing AML sites.

Virginia Institute of Marine Science

The Virginia Institute of Marine Science (VIMS), primarily through the Coastal Watershed Center (CWC) and under the authority of sections 28.2-1100, 1205 and 1301 of the *Code of Virginia*, provides technical assistance to the commonwealth regarding activities that may impact the natural resources within the coastal waters of the state. This may include sand and gravel pits as well as other surface mining operations. The CWC conducts educational programming to inform local governments, state agencies and citizens about water quality issues and provides a technical report series on various topics regarding the waters of the commonwealth.

U.S. Army Corp of Engineers

DMME, through the DMLR's AML Section and the state sponsor, the Lenowisco Planning District Commission, is providing AML matching money for the Powell River Watershed Ecosystem Restoration Project in conjunction with the U.S. Army Corps of Engineers (USACOE). The study will look primarily at AMD impacts to the Powell River ecosystem related to coal mining. Reconnaissance and feasibility studies in the Ely, Pucket and Straight creek tributaries of the Powell River watershed will be completed this summer. AML matching funds committed to date total \$400,000 on a 50/50 match. Design and construction phases of the

project will start this fall with a construction start projected for 2000-2001.

The Powell River Watershed Ecosystem Restoration Project is a multiphase, multiyear project with a total projected cost of \$7 million over the next five to seven years. A streamline feasibility study for other watersheds of the North Fork of the Powell River Basin (Reeds, Jones, Bundy and Cox creeks) has just started.

The USACOE is also preparing reconnaissance studies for the Upper (headwater) Powell River watershed and the Clinch River watershed. The DMME will work closely with the USACOE on this project as well. Local sponsors and funding sources have not been secured at this time.

Department of Game and Inland Fisheries

Under an agreement with the DMLR, DGIF provides technical assistance to the Abandoned Mine Land Section for reclamation activities. The purpose is to determine potential adverse impacts upon fish and wildlife resources and habitats, and to recommend appropriate measures to avoid, reduce or compensate for those impacts. Emphasis is often placed on habitat restoration and improvement techniques, which enhance the quality of wildlife habitat. Two Memoranda of Agreement (MOA) were established in 1984 to implement this coordination with DMLR for general surface mining and abandoned mine land reclamation projects.

Funding Needs

DMME operates inventory and construction programs designed to identify and eliminate public safety hazards and pollution from abandoned coal and mineral mines and gas and oil wells. While effective, the scope of these programs is severely limited by the funds that are available for NPS pollution abatement.

DMME Division of Mined Land Reclamation

The DMLR's Abandoned Mined Land Section receives the majority of its funds from grants awarded to Virginia

by the U.S. Department of Interior (DOI). These funds are derived from a reclamation tax levied upon the coal mining industry. The fees are collected for the purpose of reclaiming land mined for coal prior to August 3, 1977 and which was inadequately reclaimed by today's standards. Currently, all of the fees collected by the DOI are not being returned to the states in order to reclaim abandoned lands. This greatly diminishes the amount of reclamation that can occur on abandoned lands.

Virginia's ability to address AML problems is influenced by the number and variety of problems identified in the AML inventory, the required prioritization of projects, funding allocations, and the 2004 current end-date of the AML Program. Work is far from complete at Priority 1 and 2 sites, correcting hazards such as clogged streams, highwalls, water filled pits, dangerous impoundments, refuse areas and mine subsidence. Acid mine drainages still pollute miles of streams. Additionally, funds are expended for public water supply projects in areas where the water has been degraded by past coal mining and for emergency reclamation projects.

States are allowed to spend up to 30 percent of their funds on public water supply projects, set aside 10 percent of their funds for the treatment of acid mine drainage, and use funding as necessary to abate emergency situations. Additional AML funds are set aside for the Appalachian Clean Streams Initiative, the Small Operators Assistance Program (SOAP), federal reclamation programs where states do not have an approved AML program, and federal, state and tribal administration of the program.

Through September 30, 1998, about \$155 million in reclamation fees has been collected in Virginia. Only about \$57 million has been distributed back to the state.

Virginia has more than \$110 million remaining in high Priority 1 and 2 reclamation needs as estimated by DMME. The commonwealth also has \$120 million in water projects eligible for AML funding, and \$300 million in medium Priority 3 reclamation project needs. This totals \$530 million for the higher priority projects in Virginia. Costs for lower Priority 4 and 5 needs have not been estimated. Virginia receives approximately \$4.5 to \$5 million each year for the program. At the current rate of available funding, it will take Virginia 50 years to reclaim its most critical sites abandoned prior to 1977.

When eligible water projects and sites mined between 1977 and 1981 are added, it will take over 100 years.

Currently, additional funding is being received for specific projects from EPA through section 104(b)(3) and 319 grants.

DMME Division of Gas and Oil and Division of Mineral Mining

The DMM uses interest earned from a state managed industry self-bonding program for reclamation of orphaned mine sites which were not required by law to be reclaimed or have not been reclaimed. The DGO uses monies appropriated by the General Assembly, interest earned from those monies, and a well permit surcharge to fund the reclamation of orphaned well sites.

While the presence of these orphaned mineral mine and gas well funds is beneficial, they only allow for a limited number of sites to be reclaimed each year. With more than 3,000 abandoned mineral mine and gas and oil well sites in Virginia, DMME seeks to continue to expand the usefulness of its funds by leveraging them with grants for future projects. Approximately \$153 million would be required to reclaim the estimated 3,000 abandoned mineral mines.

Currently, additional funding is being received for specific projects from EPA through section 104(b)(3) and 319 grants.

Virginia Cooperative Extension

The VCE Powell River Project funding comes from a variety of sources, including state funds allocated to VPI&SU, and contributions by the coal industry and other southwest Virginia natural resource firms. Continuation of the Powell River Project's current programming is dependant upon funding provided by both the state and the coal industry. If Virginia's coal production continues to decline, industry support for these programs at current levels may be jeopardized. The Powell River Project is seeking to continue and expand research and education programming by seeking funds from a wider range of sources.

OBJECTIVES (SHORT-TERM GOALS)

Four objectives (short-term goals) were identified by the work group regarding resource extraction activities. These goals target the abandoned and orphaned sites. This approach will address the issues identified by the work group: TSS, acid mine drainage, heavy metal contamination, impacts to biota, and surface and ground water quality. The abandoned coal mine sites that qualify for remining activity will be permitted and the associated potential water quality impacts will be addressed through the NPDES point source permit process. The objectives are:

Objective 1. Determine the magnitude and quantity of nonpoint source pollution impacts to the environment from abandoned coal mines, orphaned mineral mine sites, and orphaned gas and oil wells so that reclamation activities can be prioritized

Objective 2. Continue and enhance, where possible, the reclamation of abandoned coal mines, orphaned mineral mines, and orphaned gas and oil sites with the greatest potential for reducing nonpoint source pollution to surface and ground water from TSS, heavy metals, and acid mine drainage (low pH), that impact the health and safety of residents and living resources of Virginia

Objective 3. Support and develop research and education activities to improve the knowledge and understanding of Virginia residents regarding resource extraction activities and the environment

Objective 4. Identify opportunities for developing partnerships with state and federal agencies and other interested organizations to address nonpoint source pollution from abandoned mines

TABLES OF OBJECTIVES & STRATEGIES

The milestones presented in this section reflect the fact that limited resources are available to quickly and completely address the extent of NPS pollution associated with abandoned and orphaned mine lands. Several activities conducted annually will continue based on the presumption that current levels of funding will be maintained.

Additional activities, such as complete incorporation of the DMME mine land information into the DCR NPS Pollution Watershed Assessment process and the DEQ 305(b) and 303 (d) list reports, are new and will require innovative approaches to funding and for addressing the issues. Of increasing importance is the availability of Abandoned Mine Land funds and the use of remining activities for reclamation. More effective use of these two elements could increase the number of sites annually reclaimed resulting in greater annual water quality improvements.

| OBJECTIVE 1 | | | | |
|--|--|-----------------------------------|-----------------------------------|--|
| <i>Determine the magnitude and quantity of nonpoint source pollution impacts to the environment from abandoned coal mines, orphaned mineral mine sites, and orphaned gas and oil wells so that reclamation activities can be prioritized</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 1.1 Incorporate mining data into NPS pollution water quality databases | | •DMME •DCR •DEQ | 2003 - update annually thereafter | •General Fund |
| | Develop data format and protocol for agency information exchange | •DMME •DCR •DEQ | 2000 | •General Fund •US Dept. of the Interior |
| | Initiate data incorporation into NPS pollution watershed prioritization process | •DCR •DMME •DEQ | 2001 | •General Fund |
| | Initiate incorporation of abandoned site data information into 303(d) list of impaired streams | •DMME •DCR •DEQ | 2001 | •319 grant •General Fund •US Dept. of the Interior |
| | Develop targeted monitoring plan to support and strengthen reclamation efforts | •DEQ •DMME •Citizens groups | 2003 | •Unknown |
| 1.2 Continue programs to inventory and prioritize abandoned mine sites | | •DMME | Ongoing | •319 Grant •General Fund •US Dept. of the Interior |
| 1.3 Review and evaluate progress | | •NPSAC agencies | Annually | •N/A |

| OBJECTIVE 2 | | | | |
|---|---|---|-----------------|--|
| <p><i>Continue and enhance, where possible, the reclamation of abandoned coal mines, orphaned mineral mines, and orphaned gas and oil sites so that available resources are targeted to those sites with the greatest potential for reducing nonpoint source pollution to surface and ground water from TSS, heavy metals, and acid mine drainage (low pH), that impact the health and safety of residents and living resources of Virginia</i></p> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 2.1 Utilize the NPS watershed prioritization process developed in 1996 | | <ul style="list-style-type: none"> •DMME •DCR •DEQ | Ongoing | <ul style="list-style-type: none"> •General Fund |
| | Systematically inventory and conduct site investigations on all orphaned mineral mine sites in the state and continue to refine the protocol as appropriate | <ul style="list-style-type: none"> •DMME | 2015 and beyond | <ul style="list-style-type: none"> •319 grant •RAMP and AML funds (if available) •General Fund |
| 2.2 Ensure that habitat protection is an integral part of plans developed for the reclamation of abandoned and orphaned mine sites | | <ul style="list-style-type: none"> •DMME •DCR •PDCs •CBLAD •Localities | Ongoing | <ul style="list-style-type: none"> •319 grant •RAMP and AML funds (if available) •General Fund |
| | Continue to include habitat restoration in reclamation activities | <ul style="list-style-type: none"> •DMME •DGIF | Ongoing | <ul style="list-style-type: none"> •319 grant •RAMP (if available) AML funds (if available) •General Fund |
| | Initiate work with localities to ensure inclusion or re-creation of resource protection area buffer in reclamation plans | <ul style="list-style-type: none"> •CBLAD •DCR •DMME •PDCs | 2001 | <ul style="list-style-type: none"> •Unknown |

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|----------------------------|
| OBJECTIVE 2 (Cont.) |
|----------------------------|

Continue and enhance, where possible, the reclamation of abandoned coal mines, orphaned mineral mines, and orphaned gas and oil sites so that available resources are targeted to those sites with the greatest potential for reducing nonpoint source pollution to surface and ground water from TSS, heavy metals, and acid mine drainage (low pH), that impact the health and safety of the residents and living resources of Virginia

| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
|--|---|-------------------|---|--|
| 2.2 (Cont.) habitat protection | Continue to work with natural resource agencies | •DMME | Ongoing | •319 grant •RAMP and AML funds (if available) |
| 2.3 DMLR will remediate acid mine drainage sites in the Ely Creek watershed | Complete implementation of reclamation plan | •DMME | 2001 | •General Fund •US Dept. of the Interior •319 Grant |
| 2.4 Continue to solicit funding for, and reclaim, 20 - 25 abandoned and orphaned mine sites per year | | •DMME | 25 sites annually (if current levels of funding are maintained) | •319 grant •US Dept. of the Interior •RAMP and AML funds (if available) |
| | Reclaim 15 - 18 coal sites | •DMME | Annually (at current funding levels) | •US Dept. of the Interior •RAMP and AML funds (if available) |
| | Plug 15 orphaned and forfeited wells | •DMME | 2005 | •Permit fees |
| | Plug 15 orphaned and forfeited wells | •DMME | 2010 | •Permit fees |
| | Plug 15 orphaned and forfeited wells | •DMME | 2015 | •Permit fees |

OBJECTIVE 2 (Cont.)

Continue and enhance, where possible, the reclamation of abandoned coal mines, orphaned mineral mines, and orphaned gas and oil sites so that available resources are targeted to those sites with the greatest potential for reducing nonpoint source pollution to surface and ground water from TSS, heavy metals, and acid mine drainage (low pH), that impact the health and safety of the residents and living resources of Virginia

| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
|---|---|---|--------------------------------------|--|
| 2.4 (Cont.) solicit funding for, and reclaim, 20 - 25 abandoned and orphaned mine sites per year | Reclaim 3 - 6 mineral mine sites | •DMME •DCR | Annually (at current funding levels) | •Orphaned Mine Funds •319 grant |
| 2.5 Seek release of tax generated AML funds | | •Industry •DMME •DCR •DEQ | Ongoing | •N/A |
| 2.6 Pursue the development of remining regulations and incentives to encourage the reclamation of abandoned coal mine sites | Incorporate recommendations of Ad Hoc Remining Task Force | •DMME •DCR •DEQ •NRCS •EPA •Industry Organizations | Ongoing | •N/A |
| | Identify sites appropriate for remining | •DMME •DCR •DEQ •NRCS •Industry Organizations | Ongoing | •N/A |
| 2.7 The DMLR will remediate acid mine drainage sites in the Powell River watershed | | •DMME | 2007 | •USA-COE •Leno-wisco PDC •OSM |
| 2.8 Remediate AMD sites in the Powell River watershed | Continue with reclamation activities | •DMME | 2007 | •USA-COE •Leno-wisco PDC •OSM |
| OBJECTIVE 2 (Cont.) | | | | |

Continue and enhance, where possible, the reclamation of abandoned coal mines, orphaned mineral mines, and orphaned gas and oil sites so that available resources are targeted to those sites with the greatest potential for reducing nonpoint source pollution to surface and ground water from TSS, heavy metals, and acid mine drainage (low pH), that impact the health and safety of the residents and living resources of Virginia

| | | | | |
|--|---|---|--------|--|
| 2.9 Prioritize reclamation activities, when possible, to coincide with current TMDL activities | Identify sites appropriate for reclamation in support of the TMDL process | <ul style="list-style-type: none"> •DMME •DCR •DEQ •NRCS •Industry organizations | 2010 | <ul style="list-style-type: none"> •319 grant •US Dept. of the Interior •RAMP and AML Funds (if available) |
| 2.10 Review and evaluate progress | | <ul style="list-style-type: none"> •NPSAC agencies | Annual | <ul style="list-style-type: none"> •N/A |

| OBJECTIVE 3 | | | | |
|--|---|---|-------------|---|
| <i>Support and develop research and education activities to improve the knowledge and understanding of Virginia residents regarding resource extraction activities and the environment</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 3.1 Conduct research, and develop and apply cost-effective land reclamation and environmental control strategies for reforestation of mined lands, remediation of acid mine drainage, mined land revegetation, watershed restoration and other subject areas as identified | | <ul style="list-style-type: none"> •VCE Powell River Project •VPI&SU •DMME •OSM •USA-COE | Ongoing | <ul style="list-style-type: none"> •VCE Powell River Project •Coal industry •VPI&SU •DMME |
| | Expand the Powell River Project <i>Reclamation Guidelines</i> publication series for remediation of acid mine drainage and update the remaining series as needed | <ul style="list-style-type: none"> •VCE Powell River Project •VPI&SU | 2001 | <ul style="list-style-type: none"> •VCE Powell River Project •Coal Industry •VPI&SU •DMME |
| 3.2 Conduct educational programs to inform appropriate clientele about land reclamation and environmental protection technologies developed through research | | <ul style="list-style-type: none"> •VCE Powell River Project | Ongoing | <ul style="list-style-type: none"> •VCE Powell River Project •Coal industry •VPI&SU |
| | Continue conducting environmental education programs at the Powell River Project Education Center for 1,000 students who attend schools in Virginia's coal-producing region | <ul style="list-style-type: none"> •VCE Powell River Project | Annually | <ul style="list-style-type: none"> •VCE Powell River Project •Coal industry •VPI&SU |
| | Conduct 1 -2 curriculum development workshops for 20 - 25 teachers who bring their students to the Powell River Project Education Center | <ul style="list-style-type: none"> •VCE Powell River Project | Annually | <ul style="list-style-type: none"> •VCE Powell River Project •Coal industry •VPI&SU |

| OBJECTIVE 3 (Cont.) | | | | |
|--|--|---|--------------------|---|
| <i>Support and develop research and education activities to improve the knowledge and understanding of Virginia residents regarding resource extraction activities and the environment</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 3.2 (Cont.) educational programs | Develop education materials regarding mineral extraction activities in Virginia to help meet secondary school Standards of Learning (SOLs) | <ul style="list-style-type: none"> •DMME Dept. of Education •Private industry | 2000 | <ul style="list-style-type: none"> •Private industry |
| 3.3 Review and evaluate progress | | <ul style="list-style-type: none"> •NPSAC agencies | Annually | <ul style="list-style-type: none"> •N/A |

| OBJECTIVE 4 | | | | |
|---|---------------|--|-------------|-----------------|
| <i>Identify opportunities for developing partnerships with state and federal agencies and other interested organizations to address nonpoint source pollution from abandoned mines</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 4.1 Present technology transfer seminars annually within mining communities to promote the use of BMPs | | <ul style="list-style-type: none"> •DMME •DCR •DEQ •NRCS •VCE Powell River Project •Local gov't •Stake-holders | Annually | •N/A |
| 4.2 Continue the work of the Remining Ad Hoc Advisory Work Group, whose members represent the coal industry, planning district commissions, state colleges and universities, state and federal agencies and a national environmental organization | | <ul style="list-style-type: none"> •DMME •DCR •DEQ •NRCS •VCE Powell River Project •Local gov't •Stake-holders | Ongoing | •General Fund |
| 4.3 Identify ways to increase interaction between research, education, mining and environmental communities | | <ul style="list-style-type: none"> •DMME •DCR •DEQ •NRCS •VCE Powell River Project •Local gov't •Stake-holders | Ongoing | •Unknown |

| OBJECTIVE 4 (Cont.) | | | | |
|--|---------------|--|-------------|-----------------|
| <i>Identify opportunities for developing partnerships with state and federal agencies and other interested organizations to address nonpoint source pollution from abandoned mines</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 4.4 Identify ways to obtain increased or new funding for reclamation of abandoned mine sites | | <ul style="list-style-type: none"> •DMME •DCR •DEQ •NRCS •VCE Powell River Project •Local gov't •Stake-holders | Ongoing | •Unknown |
| 4.5 Review and evaluate progress | | •NPSAC | Annually | •N/A |

WORK GROUP MEMBERS & AGENCY/ORGANIZATION REPRESENTED



Resource Extraction

Department of Conservation & Recreation Facilitator
Mr. Mark Slauter

Nonpoint Source Planning and Grants Program Manager
Mr. Rick Hill

Dr. John Anderson
Virginia Commonwealth University

Mr. Harry Augustine
Virginia Department of Environmental Quality

Mr. Rod Bankson
Holman's Creek Project

Mr. Allen Bishop
Virginia Department of Mines, Minerals and Energy

Mr. Meryl Christianson
Friends of the Shenandoah

Mr. Jerry Elkins
Lonesome Pine Soil and Water Conservation District

Mr. Scott Emery
Hampton Roads Planning District Commission

Mr. Brian Ganoe
Natural Resources Conservation Service

Dr. David Gruber
Biological Monitoring, Inc.

Mr. Wayne T. Halbleib
Virginia Aggregates Association

Mr. Kirk Havens
Virginia Institute of Marine Science

Mr. Neal Kilgore
Virginia Department of Conservation and Recreation

Mr. Billy Mills
Mattaponi and Pamunkey Rivers Association

Mr. Shep Moon
Chesapeake Bay Local Assistance Department

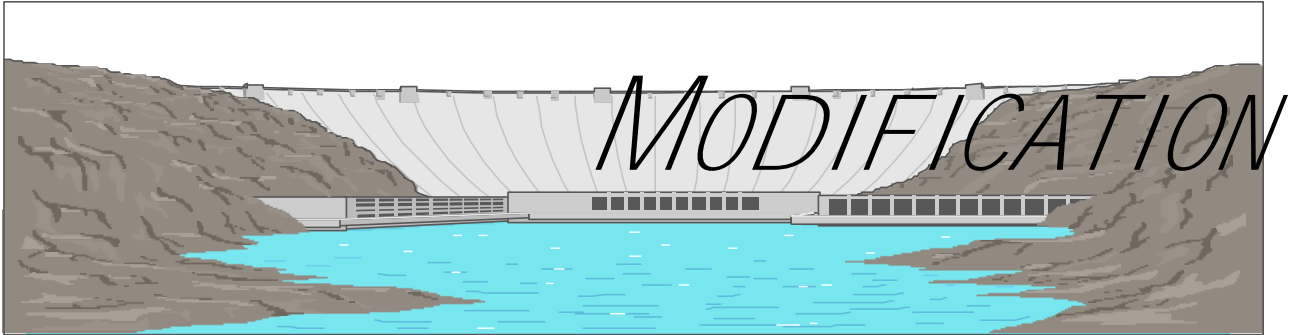
Mr. Dan Poteet
Pittston Coal Group

Mr. Jon Rockett
Powell River Project

Mr. Tony Watkinson
Virginia Marine Resources Commission

Mr. Carl E. Zipper
Virginia Polytechnic Institute and State University

HYDROLOGIC



LONG-TERM GOAL (15- YEAR)

Adverse effects of hydrologic modifications on water quality throughout the Commonwealth of Virginia will be minimized by using proper design methodologies and best management practices (BMPs)

INTRODUCTION

Hydrologic modification is the alteration of stream flow by human activities. All hydrologic modifications, whether properly or improperly implemented, may result in nonpoint source (NPS) pollution to the waters of the Commonwealth of Virginia, impacting aquatic and riparian habitats.

Population growth and development may cause land use changes that result in hydrologic changes to the watersheds of Virginia. Channel modifications are sometimes needed to maintain navigable waterways and control flooding. Dam construction and operation is often necessary to store water for irrigation, recreation, flood control and to provide a source of drinking water. Yet, these activities can be nonpoint sources of pollution and adversely affect water quality and habitat if not

properly managed.

The principle NPS pollutant resulting from hydrologic modification is sediment. However, nutrients and toxics may also be associated with the sediment produced by these activities.

Watershed development and disturbances to riparian areas may result in:

- C increased streambank or shoreline erosion,
- C water quality degradation and
- C destruction of sensitive aquatic habitat.

In particular, channel modifications undertaken in streams or rivers to straighten, relocate or change the depth or width of a channel can alter

- C instream water temperature,
- C physical and chemical characteristics of bottom sediments,
- C rate and characteristics of sediment transport and deposition and

C flooding frequencies of downstream property. In addition, some channel modifications require maintenance dredging, which can diminish the suitability of aquatic and riparian habitat for fish and wildlife. While some adverse impacts associated with channel modification activities may be temporary, loss of habitat and the need for ongoing maintenance can have significant long-term consequences.

Siting, constructing and operating dams and impoundments can result in significant changes in the ecology of streams and rivers. The construction of dams may result in considerable increases in nonpoint source pollution such as increased sediment loading and chemical contaminants. Dam operation can produce changes in water temperature and water chemistry (pH and dissolved oxygen). In addition, dams and impoundments can disrupt the natural transport of sediment and can result in significant changes to instream flow.

AGENCY ROLES & RESPONSIBILITIES

Virginia Marine Resources Commission

Coastal Primary Sand Dunes Management
(Sec. 28.2-1400 through 28.2-1420 of the *Code of Virginia*)

Submerged Lands Management Program
(Sec. 28.2-1200 through 28.2-1213 of the *Code of Virginia*)

Tidal Wetlands Management Program
(Sec. 28.2-1300 through 28.2-1320 of the *Code of Virginia*)

VMRC administers the Submerged Lands, Tidal Wetlands and Coastal Primary Sand Dunes/Beaches programs and is charged with the review of all tidal wetlands and sand dune permit decisions of local wetlands boards. The Tidal Wetlands program applies throughout Tidewater, Virginia, and each Tidewater locality has the option of adopting the wetlands or dunes acts and forming a wetlands board to review applications for use or development of tidal wetlands or dunes. The Submerged Lands program applies state-wide to all state-owned submerged lands. Generally this would include waterways with flows greater than five cubic feet per second or drainage areas greater than five square miles.

Permits are issued through a joint permit review process involving local, state and federal agencies. Permits are reviewed based on compliance with statutory requirements, Wetlands Guidelines, Subaqueous Guidelines, Coastal Primary Sand Dunes/Reaches Guidelines and Mitigation/Compensation criteria as well as recommended Best Management Practices. Advisory assistance is provided by cooperating state and federal agencies. This includes comments from the Department of Environmental Quality, the Department of Conservation and Recreation, the Department of Health, the Department of Game and Inland Fisheries and environmental impact information included in the Virginia Institute of Marine Science Shoreline Permit Application report prepared for each project.

Department of Conservation and Recreation

The Department of Conservation and Recreation (DCR) is involved in several activities related to hydrologic modifications. The Dam Safety Program approves permits for new dam construction, inspects existing dams and provides technical assistance related to dam construction and maintenance. The Erosion and Sediment Control Program addresses control measures for the erosion and sediment producing activities of the construction industry. The Storm Water Management Program deals with control measures for the increased runoff associated with development. The Floodplain Management Program is responsible for the

administration of the National Flood Insurance Program and reviewing proposed development or growth in the floodplains. The Virginia Agricultural BMP Cost-Share Program provides financial assistance to eligible property owners to implement best management practices (BMP) to correct natural resource problems. The Shoreline and Streambank Erosion Advisory Service Program provides technical assistance to property owners in effective erosion control practices to minimize the effects of erosion processes on tidal and nontidal properties.

Chesapeake Bay Local Assistance Department

Pursuant to the Chesapeake Bay Preservation Act (CBPA) of 1988, the Chesapeake Bay Local Assistance Department (CBLAD) is tasked with assisting localities and state agencies to implement state regulations aimed at reducing pollution to the Chesapeake Bay and its tributaries, as well as the protection of sensitive environmental resources in areas of Tidewater, Virginia. The act and regulations are primarily administered through local ordinances which target certain areas, designated as Chesapeake Bay Preservation areas, consisting of Resource Protection Areas (RPAs) and Resource Management Areas (RMAs). Within these areas, performance standards apply that ensure that land-use related impacts to water quality are minimized. The act requires state agencies to be consistent with local comprehensive plans, subdivision and zoning ordinances of Tidewater localities.

CBLAD assists participating local governments and state agencies in effectively implementing these local land-use regulations. In addition to commenting on site plans at a local government's request, CBLAD reviews state projects located within the locally designated Chesapeake Bay Preservation Areas for consistency with the local CBPA ordinances, as specified in §10.1-2114 of the CBPA. This ensures that the state will follow the local land use directives, when they are more stringent than the state's minimum water quality protection criteria.

CBLAD will review a local site plan at the request of a locality. The plan can be reviewed for a number of things, including the following: buffer encroachment,

erosion and sediment control, stormwater management, and comprehensive site assessments. The locality specifies the type of review being requested, and CBLAD reviews the plan accordingly. Plans are typically reviewed to determine how the local comprehensive plans, ordinances and zoning regulations will affect a proposed development project. CBLAD assists localities with technical guidance to ensure consistent implementation of the state and local standards by promoting a technically and scientifically valid approach to environmental regulation and water quality management. Upon request, CBLAD also reviews regional stormwater management programs, planned developments, rezoning requests and other development related documents. CBLAD's comments regarding local projects are considered as guidance and not requirements, since the localities maintain the authority to approve or deny approval for development projects.

CBLAD reviews site plans for state projects within Chesapeake Bay Preservation Areas. Agencies must submit documentation demonstrating that their projects comply with the provisions of the local CBPA requirements. CBLAD reviews these site plans for water quality issues, buffer encroachment issues, land planning issues, and resource protection, and coordinates these reviews with DCR for Erosion and Sediment Control and Stormwater Management. CBLAD often consults the affected localities for their advice and opinions regarding state projects to obtain guidance, ensure consistent implementation of local policy and foster a cooperative environment in which the local and state governing bodies work toward a common goal.

CBLAD's reviews of both state and local projects focus on proper and consistent implementation of local CBPA standards. Reviews for water quality impacts are based on pollution load calculations and the associated impacts to the adjacent aquatic system, and ultimately the bay. The design of BMPs for water quality enhancement, as described in this manual, is an integral part of ensuring compliance with local land use performance criteria. In addition to such structural measures, CBLAD's review considers non-structural measures which have a direct impact on water quality. The preservation of Resource Protection Area buffers, designation of reserve sewage disposal areas, evaluation of soil suitability, minimization of land disturbance and impervious cover, and impacts to existing vegetation are just a few of the "non-structural"

elements of site planning that CBLAD considers during its review process.

Department of Environmental Quality

The Department of Environmental Quality (DEQ) is empowered to issue Section 401 certifications for all discharges of dredge and fill material in the waters of the United States, which are defined as navigable or which have an average flow of greater than five cubic feet per second for all new impoundment projects and for channel modification projects in the commonwealth. The purpose of the certification is to ensure that the proposed projects comply with the applicable provisions of the Clean Water Act.

DEQ has also adopted a policy that channel management projects should be designed and operated in such a way as to minimize and preferably avoid short- and long-term adverse environmental effects. It is also DEQ policy that agricultural and urban channelization projects in natural watercourses should be limited in size to that which is essential for the protection of property and should be constructed and/or developed in a way that fish and wildlife and aesthetic values are protected.

DEQ policy regarding water storage reservoirs is that no project will be endorsed or approved unless accompanied by adequate plans and programs for safeguarding reservoir storage from loss through sedimentation from upstream erosion and shoreline erosion associated with the project. Any such plan and project shall have adequate legal and financial support. The use of the reservoir shoreline for all purposes shall be subject to local government controls that will protect the reservoir against pollution from runoff or discharge from point sources.

Three types of environmental permits are issued by VMRC; (1) subaqueous or bottom lands, (2) tidal wetlands, and (3) coastal primary sand dunes permits. VMRC's authority and responsibilities are derived from Subtitle III of Title 28.2 of the *Code of Virginia* and specifically regulate physical encroachment into these valuable resource areas.

The permit process relies on a single Virginia joint local/state/federal permit application. The review process for which this application was originally designed,

considers various local, state and federal statutes governing the disturbance or alteration of environmental resources. VMRC plays a central role as an information clearinghouse for all three levels of review. Applications receive independent, yet concurrent, review by local wetland boards, VMRC, DEQ and the U.S. Army Corps of Engineers.

Department of Game and Inland Fisheries

The Department of Game and Inland Fisheries (DGIF) manages the commonwealth's wildlife resources, excluding insects and salt water organisms. DGIF reviews and comments on DEQ, Virginia Marine Resources Commission (VMRC) and Virginia Department of Transportation (VDOT) permits related to hydrologic modifications and provides inputs to federal actions via the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq). Information provided by DGIF is important in minimizing effects on wildlife resources.

DGIF is also directly involved with hydrologic modifications. DGIF owns, operates and manages 27 public fishing lakes statewide. DGIF also actively manages fishery resources in most privately owned hydroelectric and publicly owned water facilities and DCR state park lakes. DGIF also provides technical assistance regarding streambank stabilization measures to property owners experiencing streambank erosion problems.

Virginia Department of Transportation

The Virginia Department of Transportation (VDOT) operates and maintains the commonwealth's highway system. To implement this responsibility, VDOT performs hydrologic modifications related to stream crossings and channel modifications. VDOT currently utilizes geomorphological design principles when implementing stream channel modifications and streambank protection measures for projects.

USDA Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) is involved in carrying out hydrologic modifications under

several programs. Projects are implemented using the authority of the Flood Control Act of 1944 (PL-534) and the Watershed Protection and Flood Prevention Act of 1954 (PL-566), and with the support of local sponsors, NRCS implements hydromodifications through direct methods, such as dams, and through indirect methods, such as land use changes. Where natural disasters have occurred, the Emergency Watershed Protection (EWP) program enables NRCS to make modifications to streams necessary to reestablish a functioning stream system. The Conservation Operations (CO-01) program provides technical assistance to individual landowners on practices such as streambank stabilization.

Tennessee Valley Authority

The Tennessee Valley Authority (TVA) is responsible for studying, testing and demonstrating methods for properly using, conserving and developing the natural resources of the Tennessee Valley, which includes southwestern Virginia. TVA has constructed projects for flood control, navigation, electric power, agricultural uses, recreation and streambank stabilization. TVA has extensive experience with BMPs for hydrologic modifications and supports the use of geomorphological design principles when designing and implementing projects.

ISSUE IDENTIFICATION & PROGRAM ASSESSMENT

Virginia has several programs to address nonpoint source pollution through the implementation of Best Management Practices (BMPs). During program development, Hydromodification Work Group members identified areas that require enhancement and improvement:

- C designers of BMPs need to use correct technical information for evaluation and design,
- C BMPs need to be properly installed and maintained,

- C technical information and specifications for BMPs needs to be made available in a more usable format for installers, contractors and inspectors, and
- C urbanization has changed flow patterns along drainage, resulting in the possible creation of additional stream miles that need to be identified and labeled as streams.

Virginia's commitment to the preservation and restoration of riparian buffers is supported by the Conservation Reserve Enhancement Program (CREP) and the *Riparian Buffer Implementation Plan* (Plan). The Plan has targeted 610 miles of riparian buffer restoration in the bay watershed by 2010 and CREP has targeted 30,500 acres (22,000 acres in the bay and 8,500 acres in the Southern Rivers) of riparian buffers and filter strips. While implementation of these measures provide tools for addressing streambank erosion and channel stability issues, structural measures are often needed to adequately address the problems. Therefore, streambank and channel restoration projects should be designed and constructed utilizing geomorphological design considerations through an overall watershed approach.

Virginia has many rivers, streams and creeks. These waterways provide recreational opportunities, drinking water and wildlife habitat. While almost all water bodies are identified on topographic maps, urbanization has changed flow patterns along drainage ways, which has resulted in the possible creation of additional stream miles throughout the commonwealth. Therefore, there is a need to develop a process for defining and identifying streams. The process should include identification of streams with channel stability problems, eroding streambanks and water quality or habitat problems associated with channelization.

Virginia's efforts to preserve and improve aquatic resources have focused mainly on nutrient and sediment reductions. This is evidenced by the nutrient reduction goals of the Chesapeake Bay Agreement and the BMP goals in the tributary strategies. The health of living resources is also dependent on water quantity. Therefore, minimum instream flow regulations should be part of the updated program.

Dredging and instream sand mining projects contribute to the economic viability of the commonwealth. Dredging maintains waterways for commercial shipping, recreational boating and national defense. Instream sand mining provides an economical source of raw materials needed for roads and building construction. However, these two practices may contribute to NPS pollution problems.

Department of Conservation and Recreation

Erosion and Sediment Control Law (Sec. 10.1-560, et seq. of the *Code of Virginia*)

Erosion and sediment control plans must utilize practices defined in the 1992 *Virginia Erosion and Sediment Control Handbook*. State sponsored projects are reviewed and approved by the Department of Conservation and Recreation (DCR). Private projects are reviewed and approved by the local government with DCR oversight. The Erosion and Sediment Control Law is applicable statewide.

This law requires an approved erosion and sediment control plan for land disturbing activity involving 10,000 or more square feet. A compliance inspection is performed during construction to ensure that the plan is followed. Pursuant to Standard 19 of the Virginia Erosion and Sediment Control Regulations, an adequate receiving channel is required. This requirement helps ensure that any required channel modifications do not induce down stream erosion.

Floodplain Management Program (Sec. 10.1-602, et seq. of the *Code of Virginia*)

All channel modifications require a local government permit for hydraulic evaluation. Channel relocations require state National Flood Insurance Program (NFIP) coordination and review. Drainage system maintenance and debris removal to maintain flood capacity are credible activities under the NFIP Community Rating System for participating localities that choose to require them.

Scenic Rivers Act (Sec. 10.1-400 through 10.1-418 of the *Code of Virginia*)

DCR reviews and makes recommendations to regulatory

agencies regarding all proposals for the use and development of water and land related resources or other uses which have the potential to change the character of a stream or waterway or destroy the scenic values of designated scenic rivers. Full consideration and evaluation of the river as a scenic resource will be given before channel modification proposals are approved.

The Scenic Rivers Act is applicable statewide to those water bodies designated as scenic rivers by an act of the Virginia General Assembly. Approximately 225 miles of Virginia waterways have been designated as scenic rivers.

Stormwater Management Act (Sec. 10.1-603.1, et seq. of the *Code of Virginia*)

A stormwater management plan is required for state sponsored projects. These plans are reviewed and approved by DCR. The Stormwater Management Program is optional for local governments. Where local programs exist, stormwater management plans for private projects are reviewed and approved by local government. Plans are required for projects that disturb one or more acres and which would affect storm water quantity and quality. Technical assistance regarding the Stormwater Management Law is available to participating localities through DCR.

Department of Environmental Quality

Virginia Water Protection Permit Act (Sec. 62.1-44.15.5 of the *Code of Virginia*)

The Virginia Water Protection Permit (VWPP) requires that an application be prepared for all channelization and channel modification projects. Permit applications are evaluated on a case-by-case basis for potential impacts to water quality. Channel modification projects projected to have minor, or insignificant, impacts to state waters and wetlands, and qualifying for nationwide or regional permits from the Corps of Engineers, may not require program review. Modeling of effects may be required as part of the project evaluation process if impacts are expected to be significant. Pre-construction sampling may be required to establish baseline water quality data. DEQ staff work with applicants to reduce or eliminate undesirable water quality and habitat effects

during the preapplication and application review process. BMPs may be required for project implementation. Seasonal restrictions may also be stated in the permit.

Department of Game and Inland Fisheries

Virginia Endangered Species Act (Sec. 29-230 through 29-237 of the *Code of Virginia*)

The Virginia Endangered Species Act prohibits actions that would harass or harm a state or federally listed endangered or threatened species, including significant habitat modifications or degradation, or other intentional or negligent acts or omissions that kill or injure wildlife by significantly impairing essential behavior patterns including breeding, feeding or sheltering. DGIF administers the Virginia Endangered Species Program and consults with regulatory agencies issuing permits which may affect endangered or threatened species. DGIF also assists in the investigation and prosecution of violations. Permits required for channelization and channel modification projects require consultation with DGIF to help ensure the protection of these resources.

Virginia Marine Resources Commission

Submerged Lands Management Program (Sec. 28-2-1200 through 28-2-1213 of the *Code of Virginia*)

VMRC administers the Submerged Lands Permitting Program throughout the state. In non-tidal areas this program includes waterways with flows greater than five cubic feet per second or drainage areas greater than five square miles.

Permits are issued through a joint permit review process involving local, state and federal agencies. Permits are reviewed based on compliance with statutory requirements and *Subaqueous Guidelines* as well as technical assistance provided by cooperating state and federal agencies. Technical assistance comments are received from DEQ, DCR, Department of Health (VDH), and DGIF. Impacts on water quality, water quantity, habitat and aquatic resources, as well as affects on adjacent properties, are considered during permit review. BMPs are included in permits when applicable, as are requirements for minimum flows and provisions

for continued fish passage. When applicable, permits can also require compliance with erosion and sediment control practices described in the 1992 *Virginia Erosion and Sediment Control Handbook*.

OBJECTIVES (SHORT-TERM GOALS)

(For additional strategies, objectives, and tasks regarding implementation of hydromodification management measures in the coastal zone refer to Chapter XIII Coastal Nonpoint Source Pollution Control Program.)

Objective 1. Improve the design, implementation and maintenance of BMPs installed throughout the commonwealth

Objective 2. Strengthen and improve design standards, specifications and measures implemented for streambank restoration projects throughout the state

Objective 3. Identify streams throughout the commonwealth that have NPS pollution problems related to channelization, channel instability or streambank erosion

Objective 4. Develop and implement minimum instream flow regulations for all streams in Virginia

Objective 5. Identify dredging and instream sand mining projects throughout the state that may contribute to nonpoint source pollution

TABLES OF OBJECTIVES & STRATEGIES

| OBJECTIVE 1 | | | |
|--|--|-------------|-----------------|
| <i>Improve the design, implementation and maintenance of BMPs installed throughout the commonwealth</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 1.1 Establish a workgroup to review the available BMP information and handbooks and make recommendations on new BMPs and ways to improve existing BMPs for the development of new handbooks. | <ul style="list-style-type: none"> •DCR lead •DEQ •CBLAD •VDOT •VDACS •DGIF •VCE •SWCDs •VMRC | 2002 | •General Fund |
| 1.2 Publish revised and improved handbooks and put BMP handbook on DCR website. | •DCR | 2003 | •319 grant |

| | | | |
|---|--|--------------------|---------------|
| 1.3 Develop and offer training classes on the design, implementation and maintenance of BMPs. | <ul style="list-style-type: none"> •DCR to team with cooperating agencies (•DEQ •CBLAD •VDOT •VDACS •DGIF •VCE •SWCDs •VMRC) | 2003 then annually | •319 grant |
| 1.4 Establish a technical workgroup to spot check BMP implementation on a yearly basis. | <ul style="list-style-type: none"> •DCR lead •DEQ •CBLAD •VDOT •VDACS •DGIF •VCE •SWCDs •VMRC | 2000 then annually | •General Fund |

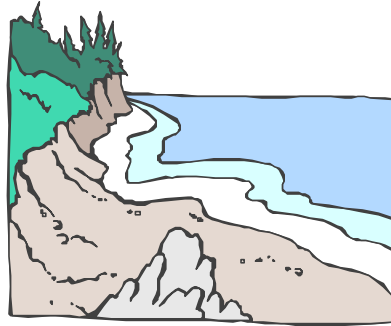
| OBJECTIVE 2 | | | |
|---|--|--------------|-----------------|
| <i>Strengthen and improve design standards, specifications and measures implemented for streambank restoration projects throughout the state</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET DATES | FUNDING SOURCES |
| 2.1 Establish a Stream Management and Technical Design Workgroup (SMTDW) to review and make recommendations about technical design standards and specifications for streambank restoration practices. | <ul style="list-style-type: none"> •DCR •NPSAC •DEQ •CBLAD •VDOT •VCE •DGIF •SWCDs •NRCS •Corp of Engineers •VMRC (above compose the SMTDW) | 2000 | •General Fund |
| 2.2 Establish technical standards and procedures for reference reach development. | •DCR through the SMTDW | 2001 | •General Fund |
| 2.3 Complete the development of reference reaches for use in streambank restoration design. | •DCR through the SMTDW | 2002 | •General Fund |
| 2.4 Develop and offer training classes regarding streambank restoration techniques. | •DCR through the SMTDW | 2002 | •319 grant |
| 2.5 Provide technical advice and project review assistance to designers or property owners implementing streambank protection projects. | •DCR through the SMTDW | 2002 | •General Fund |
| 2.6 Develop technical information and guidance on the use and application of stream restoration techniques for water quality enhancement purposes. Include efficiencies or total effective removal equivalencies for sediments and nutrients. | •DCR through the SMTDW | 2002 | •General Fund |

| OBJECTIVE 3 | | | |
|--|---|-------------|-----------------|
| <i>Identify streams throughout the commonwealth that have nonpoint source pollution problems related to channelization, channel instability or streambank erosion</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 3.1 Establish a workgroup (the Stream Management and Technical Design Workgroup may meet this need) to develop the definition of a stream and to identify all streams within the commonwealth. | •DCR •DEQ •SMTDW agencies | 2002 | •319 grant |
| 3.2 Identify sections of streams within the commonwealth contributing to nonpoint source pollution due to channelization, channel instability or streambank shoreline erosion. | •DCR •DEQ •VIMS •VMRC •COE •SWCDs •NRCS •DGIF •VDOT •VCE | 2005 | •319 grant |
| 3.3 Develop a stream classification system for use in the field in determining tributary streams affected by the CBPA. | •VIMS •DCR •CBLAD | 2003 | •Bay grant |

| OBJECTIVE 4 | | | |
|--|---|-------------|-----------------|
| <i>Develop and implement minimum instream flow regulations for all streams in Virginia</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 4.1 Establish a work group to review and make recommendations on how to strengthen all laws dealing with minimum instream flow conditions. | •DEQ-lead •DGIF •DCR •CBLAD •VDACS •VCE •VMRC •SWCDs | 2002 | •General Fund |

| 4.2 Establish minimum instream flow conditions for all streams in the commonwealth. | •DEQ | 2005 | •319 grant |
|--|---|--------------------|------------------------|
| OBJECTIVE 5 | | | |
| <i>Identify dredging and instream sand mining projects throughout the state that may contribute to nonpoint source pollution</i> | | | |
| STRATEGIES & RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 5.1 Identify and map the location of channel maintenance dredging projects and instream sand mining activities that may contribute to nonpoint source pollution. | •DEQ •VMRC •DGIF •DMME •DCR | 2001 | •319 grant |
| 5.2 Establish a work group to identify nonpoint source pollution problems associated with the identified channel maintenance dredging projects and instream sand mining activities and to make recommendations on what BMPs should be implemented to address the problems. | •DEQ •VMRC •DGIF •DCR •VCE •DMME •SWCDs | 2003 | •General Fund |
| 5.3 Incorporate work group recommendations into existing permitted projects when the permit is reissued or extended. | •DEQ •VMRC •DMME •DCR | 2004 | •N/A |

WORK GROUP MEMBERS & AGENCY/ORGANIZATION REPRESENTED



Hydromodification

Department of Conservation & Recreation Facilitator

Mr. Lee Hill

Nonpoint Source Planning and Grants Program Manager

Mr. Rick Hill

Mr. Harry Augustine
Department of Environmental Quality

Mr. Doug Beisch
Chesapeake Bay Local Assistance Department

Ms. Dawn Biggs
Reston Association

Mr. Corey Garyotis
Department of Conservation & Recreation

Mr. Darryl Glover
Department of Conservation & Recreation

Mr. Al Gregg
Department of Conservation & Recreation

Mr. Scott Hardaway
Virginia Institute of Marine Science

Ms. Alicia Ketchum
USDA Natural Resources Conservation Service

Dr. Albert Kuo
Virginia Institute of Marine Science

Mr. James Davis-Martin
Department of Conservation & Recreation

Mr. Larry Mohn
Department of Game & Inland Fisheries

Ms. Kary Phillips
Shenandoah Valley Pure Water 2000 Forum

Mr. Mark Slauter
Department of Conservation & Recreation

Ms. Catherine Tucker
Virginia Council of Trout Unlimited

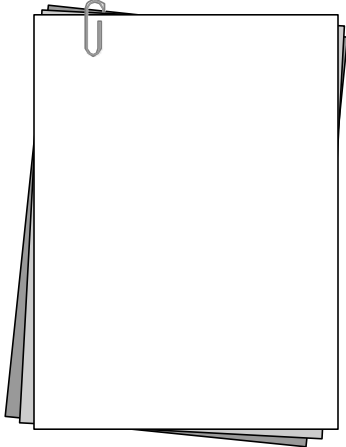
Mr. Hugo Valverde
Hampton Roads PDC

Mr. Tony Watkinson
Virginia Marine Resources Commission

Mr. Stuart Wilson
Department of Conservation & Recreation

Mr. Richard C. Woody
Virginia Department of Transportation

GRANT AND TECHNICAL ASSISTANCE COORDINATION



LONG-TERM GOALS

Goal 1 - To achieve maximum water quality benefits from available grant funds

Goal 2 - To ensure that technical assistance and support is needed to achieve maximum water quality benefits is established

Goal 3 - Develop new public-private partnerships to enhance funding for ongoing nonpoint source program initiatives and implementation activities

INTRODUCTION

With the update of Virginia's Nonpoint Source (NPS) Pollution Management Program comes new opportunities and new challenges. One of the key challenges Virginia faces is efficient and cost-effective use of limited resources. To meet this challenge, Virginia will need to carefully coordinate program funding and target limited grant dollars. As well, Virginia will need to ensure that land owners, local governments and project sponsors receive adequate technical assistance.

As a result of funding provided by Congress for the President's Clean Water Action Plan and enactment and approval of the Virginia Water Quality Improvement Act by the governor and Virginia General Assembly, funding for Virginia's NPS Management Program has increased substantially in recent years. Nevertheless, the costs of controlling NPS pollution far exceed available funding, so efficient and effective use of available funding as critical as ever.

NPS Pollution Issues Related to Resource Coordination

Although limited resources and inadequate coordination do not cause NPS pollution, they can result in lost opportunities for correcting existing problems. Effective program coordination can help ensure efficient use of limited resources. In addition, it can help target resources to where they have the greatest impact.

Effective coordination requires identification of the full range of incentive and technical assistance programs and a determination of opportunities to improve program coordination or better leverage program funding for conservation activities.

AGENCY ROLES & RESPONSIBILITIES

The Commonwealth of Virginia administers numerous technical assistance and financial incentive programs that support conservation activities. Similarly, a number of federal programs provide financial and technical assistance and many non-governmental organizations provide grants for conservation activities. Examples of state and federal incentive programs include:

- Virginia Agricultural BMP Cost Share Program
- Water Quality Improvement Fund
- Virginia BMP Tax Credit Program
- Wetland Reserve Program
- Section 319 Grant Program
- Conservation Reserve Enhancement Program
- Reforestation of Timberlands Program

Department of Conservation and Recreation

Section 319 of the Clean Water Act requires that states develop and implement NPS Management Programs. In addition, this statute authorizes funding for program development and implementation. Section 10.1 of the *Code of Virginia* establishes DCR as the lead state agency for the NPS Management Program. As such, DCR administers the Section 319 grant program. DCR is also the lead agency for the Chesapeake Bay

Implementation Grant, which Virginia receives through Section 117 of the Clean Water Act.

In addition, DCR administers the Water Quality Improvement Fund established by the General Assembly through enactment of the Water Quality Improvement Act. Other grant funds administered by DCR include Coastal NPS Pollution Control Management Program funding received from the DEQ Coastal Program, and funding for soil and water conservation districts provided by the Virginia General Assembly to facilitate district programs and Tributary Strategy development and implementation.

DCR provides technical assistance for a variety of NPS programs and activities. DCR technical assistance efforts include: SWCD support, erosion and sediment control technical training and support, stormwater management training and support, nutrient management plan writing, shoreline erosion advisory service, water quality improvement cooperative programs and technical training, and project development support.

The Conservation Reserve Enhancement Program (CREP) is a cooperative effort between the Commonwealth of Virginia and the United States Department of Agriculture to enhance the water quality and the fisheries and wildlife habitat within targeted watersheds of Virginia. Program practices and funds are available through two distinct areas of the commonwealth. The overall goal of the program is to implement water quality improvement practices on 35,000 acres within Virginia.

The Chesapeake Bay CREP covers all the watersheds within the bay drainage basin. Targeted sediment and nutrient reduction goals of the program are 33,188 tons/year of sediment, 516,873 pounds/year of nitrogen and 66,953 pounds/year of phosphorus. To accomplish these goals, the bay CREP has targeted 22,000 acres of riparian buffers and filter strips, 3,000 acres of wetland restoration and 6,000 acres of perpetual easements.

The Southern Rivers CREP covers targeted watersheds outside the bay drainage basin. Targeted sediment and nutrient reduction goals of the program are 19,481 tons/year of sediment, 131,262 pounds/year of nitrogen and 31,648 pounds/year of phosphorus. To accomplish these goals, the bay CREP has targeted 8,500 acres of

riparian buffers and filter strips, 1,500 acres of wetland restoration and 2,000 acres of perpetual easements.

Department of Environmental Quality

As the lead water quality agency for the commonwealth, DEQ administers several grant programs. Specifically DEQ receives funding under Sections 106 (base and ground water) and 604(b) of the Clean Water Act of 1987. These grant programs support a wide range of activities including ground water assessment planning studies, ground water protection activities and TMDL planning studies.

In addition, DEQ administers the Virginia Coastal Program. The Coastal Program receives grants through Sections 306, 309, 310, and 6217 of the Coastal Zone Act. As a core program element, NPS pollution control receives considerable funding through these grants.

The 1999 General Assembly passed legislation allowing DEQ to provide loans to address NPS pollution from agricultural activities under the Virginia Revolving Loan Fund. Therefore, agricultural BMPs will be eligible for funding. DEQ will prioritize applications for loan assistance on a statewide basis. Applications for practices that are expected to provide the greatest water quality benefit will be given the highest funding priority. Applications considered to impact segments on the 303(d) Impaired Waters List will receive high priority. Those impacting waters on the 305(b) Threatened List, DCR high priority waters, or the Nutrient Enriched Waters List will receive a medium priority rating. All other applicants will be given lower priority.

Technical assistance is also provided by DEQ. Areas of support include pollution prevention and citizen monitoring.

The Chesapeake Bay Local Assistance Department

The Chesapeake Bay Local Assistance Department (CBLAD) receives funding from the General Assembly to support grant funding for local government program development and implementation. These grant funds provide considerable support for local NPS pollution

control efforts.

In addition to funding support, CBLAD provides NPS technical assistance to local governments in the form of program development support, technical training, plan and ordinance review, and planning and design technical information and guidance. CBLAD also supports plan review for agricultural lands.

The Role of Non-Governmental Organizations

Although numerous small challenge grants are available for NPS pollution control efforts, one of the more significant potential sources of funding is the Virginia Environmental Endowment (VEE). VEE was formed as a result of a settlement related to the release of kepone into the James River. VEE provides funding for a wide range of environmental initiatives, including NPS pollution control efforts.

Several organizations provide technical assistance to landowners, businesses and local governments. Examples include Chesapeake Bay Foundation training and public awareness efforts, and Izaak Walton League of America Save Our Streams and Sierra Club citizen monitoring support.

ISSUE IDENTIFICATION & PROGRAM ASSESSMENT

Through a work group process involving grant program managers from state and federal agencies, local government and business interests and project sponsors, a number of issues and problems related to grant coordination was identified. Grant coordination and technical assistance problems and issues are listed below.

Grant Coordination

- The need for appropriate technical, topical and programmatic expertise in grant project review was identified as a problem because projects

often involve highly technical issues or specific topics that require specialized knowledge and expertise. Problems with reviewing competitive grant projects arise when reviewers lack necessary knowledge or expertise and there is no mechanism to ensure that this expertise is considered in grant project review.

- Lack of information, a consistent calendar and schedule for grant RFPs and inadequate grant coordination causes confusion for project sponsors, hinders project planning and creates administrative problems for agency staff.
- No formal process exists for oversight of proposals submitted to multiple grant programs for funding. Similarly, no mechanism exists to route projects to the most appropriate funding source. Limited project oversight can result in the potential for double funding and the need for reprogramming projects that receive multiple awards. As well, it can result in the failure to fund worthwhile projects.
- Another project coordination issue identified by the work group was the need for a better process to leverage funding between different grant programs. This issue arises because some grant programs are intended for program and project planning and other grant programs are intended for program and project implementation. Close grant program coordination can help ensure proper targeting of limited funding.
- Another resource coordination issue identified by the work group is lack of long-term plans for watershed projects. In other words, projects often lack the planning needed to effectively address long-term water quality issues within watersheds. As a result, actions funded through grant programs may not target the priority activities needed to address water quality problems.

Technical Assistance

With a largely voluntary cooperative approach to NPS pollution control, strong technical assistance is vital to the success of water quality management efforts. Although insufficient technical assistance was not identified as a problem by the Grant and Technical Assistance Coordination work group members during program development, concerns regarding limited staff resources were identified as a potential problem. The work group also identified the lack of awareness of available technical assistance.

One key area that was identified as needing improved coordination and greater emphasis is technical training and support for soil and water conservation district employees. As well, training opportunities for district directors was identified as a critical need.

OBJECTIVES (SHORT-TERM GOALS)

Objective 1. By the FY2001 grant cycle, DCR, DEQ, CBLAD, and other cooperating state and federal agencies will establish a structure and process to ensure that grant projects are reviewed consistent with appropriate technical and programmatic expertise

Objective 2. By the FY 2001 grant cycle, cooperating state and federal agencies will establish consistent grant schedules and ensure that project sponsors are aware of funding opportunities

Objective 3. By the FY 2001 grant cycle, cooperating state and federal agencies will develop a formal process to enhance project coordination between different grant programs, and to help target projects through the most appropriate funding source

Objective 4. By the FY 2002 grant cycle, cooperating agencies will work to ensure that watershed project proposals are well connected to other watershed activities and that a plan of action exists

Objective 5. By 2004, cooperating state and federal agencies will assess existing technical assistance programs to ensure they have adequate staffing

to meet program demands

Objective 6. By 2005, cooperating state and federal agencies will complete steps to increase awareness and visibility of technical assistance programs

Objective 7. By 2002, the Department of Conservation and Recreation will expand the efforts of the community development program to secure funding from philanthropic and corporate foundations to support nonpoint source pollution control activities

TABLES OF OBJECTIVES & STRATEGIES

Goal 1 - To achieve maximum water quality benefits from available grant funds

| OBJECTIVE 1 | | | | |
|--|---|----------------------|-------------|----------------|
| <i>By the FY2001 grant cycle, DCR, DEQ, CBLAD, and other cooperating state and federal agencies will establish a structure and process to ensure that grant projects are reviewed consistent with appropriate technical and programmatic expertise</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCE |
| 1.1 Establish an interagency subcommittee of NPSAC comprised of grant program managers | DCR will request that NPSAC member agencies identify appropriate agency representatives | •NPSAC agencies | 2000 | •N/A |
| 1.2 Develop specific guidance regarding technical criteria for grant project review | Consider creation of an interagency grant MOU | •NPSAC Sub-committee | 2001 | •N/A |

| OBJECTIVE 2 | | | | |
|---|--|-------------------|-------------|----------------|
| <i>By the FY 2001 grant cycle, cooperating state and federal agencies will establish consistent grant schedules and ensure that project sponsors are aware of funding opportunities</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCE |
| 2.1 NPSAC member agencies will develop a calendar of grant funding availability | NPSAC member agencies will include grant award announcements and RFP notifications on agency web sites | •NPSAC agencies | 2000 | •N/A |

| | | | | |
|--|---|-----------------|---------|---------------|
| | NPSAC member agencies will publish information on grants | •NPSAC agencies | 2001 | •General Fund |
| | Announce funding availability and calendar at public meetings | •NPSAC agencies | Ongoing | •N/A |

| OBJECTIVE 3 | | | | |
|---|---|-------------------|-------------|----------------|
| <i>By the FY 2001 grant cycle, cooperating state and federal agencies will develop a formal process to enhance project coordination between different grant programs, and to help target projects through the most appropriate funding source</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCE |
| 3.1 Form a grant review subcommittee of NPSAC that would meet quarterly or as needed to coordinate ongoing grant programs. | Identify project proposals that may be well suited for other grant programs | •NPSAC agencies | 2000-2001 | •N/A |

| OBJECTIVE 4 | | | | |
|--|---|--|-------------|---|
| <i>By the FY 2002 grant cycle, cooperating agencies will work to ensure that watershed project proposals are well connected to other watershed activities and that a plan of action exists</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCE |
| 4.1 Focus more attention on project development through technical assistance and out-reach efforts and development and dissemination of grant program informational material | Revise RFP language and scope of work requirements to ensure that projects include or reference a watershed plan of action | •DCR •DEQ •CBLAD and other •NPSAC agencies •Watershed Conservation Roundtables | 2001 | •General Fund •Various grant funds (esp. grants with flexibility to support project planning activities) |
| | Review strategies, actions developed by Watershed Conservation Roundtable and tributary plans and other watershed efforts to determine applicability to relevant grant programs | | | |

| | | | | |
|--|--|--|------|---------------|
| 4.2 Coordinate grant project development with Watershed Conservation Roundtables and other watershed efforts | | | 2002 | •General Fund |
|--|--|--|------|---------------|

Goal 2 - By 2005, ensure that technical assistance and support needed to achieve maximum water quality benefits is established

| OBJECTIVE 5 | | | | |
|--|---|--|-------------|--|
| <i>By 2004, cooperating state and federal agencies will assess existing technical assistance programs to ensure that they have adequate staffing and resources to meet program demands</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCE |
| 5.1 NPSAC and Watershed Conservation Roundtables will conduct an assessment of technical assistance needs and agency capabilities | Submit collaborative legislative request if additional staffing needs are determined to be required to meet technical assistance demand | •NRC •DCR •DEQ and other •NPSAC agencies •Watershed Conservation Roundtables | 2003 | •General Fund •319 grant •Agency resources |
| | Survey needs of localities, business, organizations | | | |
| 5.2 Virginia Soil and Water Conservation District Association will conduct an assessment of technical assistance needs and district capabilities | Establish training programs for SWCD staff and directors | •DCR and other •NPSAC agencies | 2004 | •General Fund |

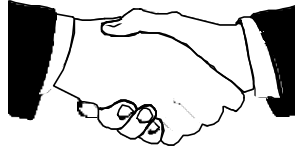
| OBJECTIVE 6 | | | | |
|--|---------------|-------------------|-------------|----------------|
| <i>By 2005, cooperating state and federal agencies will complete steps to increase awareness and visibility of technical assistance programs</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCE |

| | | | | |
|---|---|-----------------|------|------------|
| 6.1 NPSAC agencies will produce a technical assistance guide that describes technical assistance availability | Agencies will post technical assistance availability on web sites | •NPSAC agencies | 2003 | •319 grant |
|---|---|-----------------|------|------------|

Goal 3 - Develop new public-private partnerships to enhance funding for ongoing nonpoint source program initiatives and implementation activities

| OBJECTIVE 7 | | | | |
|---|---|-------------------|-------------|----------------|
| <i>By 2002, the Department of Conservation and Recreation will expand the efforts of the community development program to secure funding from philanthropic and corporate foundations to support nonpoint source pollution control activities</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCE |
| 7.1 Identify philanthropic and corporate foundation sources and explore funding opportunities | Survey other states to help identify successful community development initiatives | •DCR | 2001 | •NA |
| | Expand current cooperative efforts between DCR and private organizations | | | |

WORK GROUP MEMBERS & AGENCY/ORGANIZATION REPRESENTED



Grant & Technical Assistance Coordination

Department of Conservation & Recreation Facilitator

Mr. Rick Hill

Nonpoint Source Program Manager:

Mr. Rick Hill

Ms. Dawn Biggs
Virginia Lakes and Watersheds Association

Ms. Stephanie Byrd
ROCCO

Mr. Ken Carter
Natural Resources Conservation Service

Mr. Robert Hicks
Virginia Department of Health

Mr. Larry Land
Virginia Association of Counties

Mr. David Lazarus
Department of Environmental Quality

Mr. Charles Martin
Department of Environmental Quality

Ms. Mary-Ann Massie
Department of Environmental Quality

Mr. Larry McCarthy
Richmond Regional PDC

Mr. Duke Price
Virginia Department of Health

Ms. Margie Reynolds
Chesapeake Bay Local Assistance Department

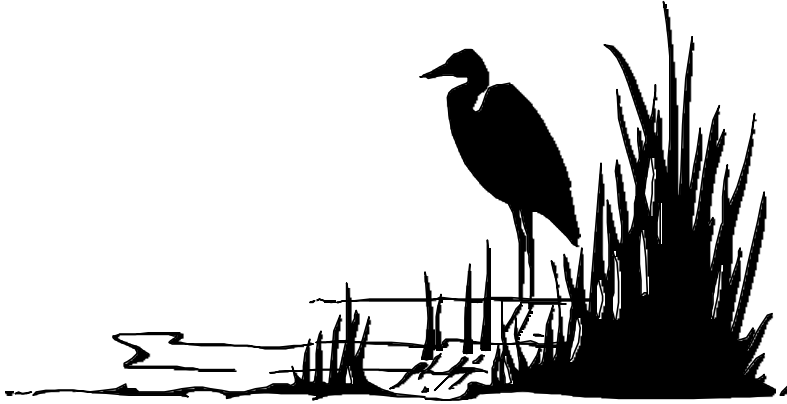
Mr. Bob Siegfried
KCI Technologies

Mr. Hugo Valverde
Hampton Roads PDC

Mr. Stuart Wilson
Department of Conservation and Recreation

Ms. Barbara Wrenn
Virginia Municipal League

COASTAL NONPOINT SOURCE POLLUTION CONTROL PROGRAM



LONG - TERM GOAL (15 YEARS)

To ensure that all applicable management measures and additional measures to reduce nonpoint source pollution are implemented by 2014 for the purpose of attaining designated uses

INTRODUCTION

The Virginia Coastal Nonpoint Source Pollution Control (CNPSPC) program was developed in response to the federal Coastal Zone Management Act Reauthorization Amendments (CZARA) of 1990. The 1990 amendments instituted a new program targeting reduction of nonpoint source (NPS) pollution in coastal areas of the United States, including the Great Lakes, entitled Protecting Coastal Waters, Section 6217. Development and implementation of a CNPSPC program is required by CZARA for those states that have an approved coastal zone management plan. Virginia's coastal zone management plan was approved in 1986.

The CNPSPC program is one of the core programs of the Virginia Coastal Program (VCP). The Virginia Coastal Program is a networked program with eight core programs operated by different state agencies. The Virginia Department of Environmental Quality (DEQ) is the lead agency and is responsible for administering the State's coastal program. The NPS pollution control core program is administered by the Department of

Conservation and Recreation (DCR). DCR is identified as the lead agency for NPS pollution in Section 10.1-104.1 of the *Code of Virginia*.

Section 6217 of CZARA states that:

The purpose of the program shall be to develop and implement management measures for nonpoint source pollution to restore and protect coastal waters, working in close conjunction with other State and local authorities.

To support this requirement, the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Environmental Protection Agency (EPA) jointly released the (g) *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*. CZARA defines the term "management measures" as "...economically achievable measures for the control of the addition of pollutants from existing and new categories and classes of nonpoint sources of pollution,

which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives.”

Virginia submitted a program document in September 1995 to NOAA and EPA for approval. In 1998, NOAA and EPA responded with a findings letter stating which management measures the Virginia program did and did not meet. This resulted in Virginia receiving “condition approval” of the program. The findings also required that, within three years, all program conditions would be addressed. Subsequent to this, and in response to key actions in the President’s Clean Water Action Plan, NOAA and EPA provided Final Administrative Changes for program implementation in October 1998 and an update in March 1999.

This new guidance requires coastal states to develop 15-year program strategies and five-year implementation plans. The administrative changes are intended to provide states with additional flexibility in meeting the requirements of Section 6217 of the CZARA. In response to the Clean Water Action Plan and guidance from EPA and NOAA to coordinate NPS pollution activities, the five- and 15-year documents have been developed and incorporated as a chapter of the 1999 Virginia NPS Management Program.

There are eight broad categories identified by Section 6217: agriculture, forestry, urban development, marina and boat operation, hydromodification, wetlands, monitoring and tracking, and technical assistance. For each of these source categories the (g) guidance contains several specific management measures that must be implemented through enforceable policies or mechanisms (laws, regulations and executive orders), back-up enforceable policies, or through voluntary efforts. Section 6217 also provides for the implementation of “additional” management measures, which are intended to allow states to identify other appropriate approaches to implementation. Implementation may include new programs, educational efforts and modifications to existing programs.

ISSUE IDENTIFICATION

Continuing discussions with NOAA and EPA have resulted in some of the initial conditions being met since the *Findings* letter was released in 1998. The priority issues for Virginia are considered as those remaining issue areas identified in the findings letter where the management measures are not being implemented sufficiently. These issues are presented as priorities for the five- and 15-year planning documents and represent the primary areas of program focus. Since Virginia’s program currently meets several of the management measures through enforceable policies and mechanisms, permit requirements, enforcement actions, reporting requirements, education and voluntary efforts, it is concluded that the state is already implementing those program measures. This does not mean that supplementary efforts would not be considered, rather Virginia will continue to monitor and track implementation of these approved program elements and continue to actively evaluate procedures to achieve greater levels of efficiency.

The following is a listing of the program elements considered to be out of compliance with program requirements by EPA and NOAA. These program elements are identified as priority issue areas for the CNPSPC program. This list follows the sequence of the *Findings* letter and does not reflect a particular prioritization of the issue areas. The list is followed by a section describing existing efforts as well as the programmatic approaches to be implemented within the 15-year planning horizon.

The program currently does not include:

- C Management measures in conformance with the guidance for irrigation water management;
- C A demonstration of the ability to achieve implementation of the forestry management measures, which should be accomplished through measurable results;
- C Management measures to reduce total suspended solids outside of the Chesapeake Bay Preservation Areas for new development;
- C Management measures for existing development by identifying priority watershed pollutant reduction opportunities and a schedule for implementing appropriate controls;

- C Management measures for adequate separation distance between new on-site disposal systems and groundwater closely hydrologically connected to surface water and limiting nitrogen loadings from new and operating onsite disposal systems near nitrogen limited surface waters;
- C Management measures for roads, highways and bridge runoff systems and for local roads not within the Chesapeake Bay Preservation Areas;
- C Management measures for stormwater runoff from boat hull maintenance operations, technical assistance and fish waste;
- C A process to improve surface water quality and restore instream and riparian habitat through the operation and maintenance of existing modified channels;
- C Management measures to manage the operation of dams to protect surface water quality and instream and riparian habitat and to assess nonpoint source pollution problems resulting from excessive surface water withdrawals;
- C A process to identify and develop strategies to solve existing nonpoint source pollution problems caused by streambank or shoreline erosion that do not come up for review under existing permit authorities;
- C A process to provide sufficient technical assistance for marina development and operation; and
- C A plan to assess over time the success of the management measures in reducing pollution loads and improving water quality.

PROGRAM DESCRIPTION

AND APPROACH

The 1995 program submittal document describes the laws, regulations and incentive-based tools available to Virginia to implement the (g) guidance management measures. These laws and programs will not be reiterated herein; however, it is important to note that Virginia was able to show how most management measures were addressed through several existing laws and programs. Based on review of the program submittal, NOAA and EPA concluded Virginia has sufficient enforceable policies and mechanisms to implement most of the (g) guidance management measures. As a result, Virginia was given conditional approval for its Coastal Nonpoint Source Pollution Control Program.

In March of 1999, NOAA and EPA provided additional information on the five- and 15-year plan requirements. One element refers to the overall 15-year approach a state will take, whether it is categorical (agriculture, urban, forestry), geographical (county, watershed, basin), or a combination of the two. Virginia will continue to implement the program through a combination of categorical and geographical approaches as outlined in the preceding chapters. There are two primary reasons for this approach.

First, the categorical approach is more appropriate when seeking legislative or statewide resolution of an issue. For example, certain agricultural activities (crop production) are conducted throughout the state. A logical approach to addressing any identified concern would be to affect the resolution on a statewide basis. Irrigation, on the other hand, is used less than four percent of farms. A logical approach to addressing irrigation issues is to work closely with the producers on a voluntary and technical basis to address NPS pollution.

Second, the ability to implement some of the management measures is more appropriate through a geographical approach. This is particularly true in Virginia where 494 watersheds are prioritized based on nonpoint source pollution potential. For certain management measures, such as streambank erosion, it is logical to identify specific watersheds or stream segments where erosion is contributing to NPS pollution. By maintaining the ability to address issues in a flexible

and innovative manner Virginia is able to target limited resources to those areas or issues requiring implementation of management measures. This approach also provides flexibility to coordinate Section 6217 activities with other NPS pollution programs. Furthermore, a combination approach provides an opportunity to address geographically and categorically specific issues through identification and implementation of additional management measures.

Virginia considers this approach to best reflect the purpose of the provisions in the *Administrative Changes* and CZARA for implementing the management measures. Pursuant to future program evaluations, it may be decided that certain categorical or geographical enhancements must be instituted to achieve the intent of CZARA and the (g) guidance as well as the beneficial use of waterways. Additional management measures are intended to allow a program to implement innovative approaches to those program elements that are unable to fully meet the desired improvements in water quality. For example, it is possible that a geographical area has fully implemented all management measures but still cannot meet water quality objectives. In this example the area should be evaluated to determine what other actions are appropriate for implementation.

Agriculture

Agriculture is a large and diverse industry in Virginia. It accounts for approximately nine million acres (30 percent) of Virginia's land use. Agricultural land uses include row crop production of grains, forage, peanuts, cotton, tobacco, and vegetables; pasture and hay production necessary for beef and dairy production; as well as facilities for poultry, swine, beef, dairy, and equine operations; orchards; and ornamental nursery operations.

Nonpoint source pollutants typically associated with agriculture include nutrients, sediment, pathogens and toxics. These pollutants can escape crop field and livestock production areas and enter surface and ground water systems. When their levels in water become significant, they can have a negative impact on aquatic life, cause a reduction in dissolved oxygen, clog water treatment system filters and weaken or destroy aquatic vertebrates and invertebrates as well as their habitat. Human use of the water may become affected as a

result of excessive plant growth, increased turbidity, damaged fisheries and wildlife habitat. NPS pollution associated with agricultural activities can also impact the water quality of ground water supplies. As detailed in the 1995 program document, Virginia has many regulatory and voluntary programs to address agricultural issues. However, increased technical assistance to irrigators needs to be provided to reduce potential NPS pollution.

For additional NPS program strategies, objectives, and tasks regarding implementation of agricultural efforts refer to Chapter VI Agriculture.

Irrigation Water Management

The extent of irrigation in Virginia does not account for a significant portion of agricultural activities. According to the 1997 U.S. Department of Agriculture census, 84,926 acres of agricultural land was irrigated in Virginia. This is less than four percent of the total crop (2.52 million acres) acreage in Virginia. Within the coastal zone there are 33,280 acres of irrigated land, which is little more than one percent of the total irrigated land in Virginia. Though this activity is not considered a significant contributor to NPS pollution, there is still a need to provide technical assistance and address any concerns that do exist. Included in Virginia's approach will be the development and distribution of publications to local governments, irrigators, plan writers and reviewers, soil and water conservation districts (SWCDs), Virginia Cooperative Extension (VCE), and other state and federal agencies.

Prior to the 1960s, irrigation equipment in Virginia consisted primarily of portable pipe systems and was used almost solely on high value crops, such as tobacco, fruits and vegetables. The extensive growth in irrigation that followed came about, in part, as a result of the development of less labor-intensive irrigation systems, specifically traveling guns and center pivots. These are both capable of efficiently irrigating large acreages of field crops, such as corn, soybeans and peanuts.

During the past 15 years relatively few large-scale systems have been installed. Much of the growth that has occurred during this period has been via the implementation of drip/trickle irrigation technology.

Additionally, recent years have shown technological changes affecting the way irrigation is accomplished. To meet these changes Virginia will update BMP pamphlets, brochures and technical documents as well as develop new technical guidance. Virginia will also conduct a series of workshops for irrigators, local government officials, environmental planners, and others that will present information on current proper techniques in irrigation, how to minimize the potential for nonpoint source pollution and installation of appropriate safety devices and controls for chemigation.

It is anticipated there will be follow up contact with the workshop participants to determine the effectiveness of the workshops and how many participants implemented the prescribed practices. As part of a long-term approach Virginia will continue to assess other educational and technical guidance and tracking opportunities. This may include working with academic institutions, SWCDs, VCE and VDACS to determine what additional courses, workshops, or fieldwork is appropriate to support and promote efficient irrigation techniques. Virginia will also analyze the option of installing a computer-based irrigation/water needs system in local VCE offices. This system would incorporate information provided by the irrigators and Cooperative Extension agents. The irrigators, in turn, would receive some form of notification or have direct access to a database describing when and how much water should be applied.

There is no indication that the NPS pollution potential resulting from irrigation water management is significant in Virginia. However, this program element is recognized as benefitting from technical assistance. Virginia will initiate a project in 1999 to begin providing technical assistance to irrigators.

Forestry

Since 1988, the Department of Forestry (DOF) has conducted an education and information program for the logging community on the impact of BMPs on living resources and water quality. The core program consists of one-on-one contact, field examinations, logger training and close collaboration with the forest industry, consultants and landowners. The Silvicultural Water Quality Task Force, an advisory group to the State Forester, introduced legislation creating an outcome based sedimentation law. This legislation became law in 1993 and gave DOF the ability to stop logging activities if stream sedimentation is occurring. During 1995, the forest industry-backed Sustainable Forestry Initiative took hold and most BMP and water quality training efforts were sponsored by the Virginia Forestry Association. Training sessions are still conducted annually, statewide, on silvicultural practices, business, safety and water quality.

As with other nonpoint sources, water quality degradation from forestry sources is a result of on-site practices, soil types, topography, landowner attitude toward conservation, and technical assistance availability. Virginia's forestry efforts remain outcome-based and voluntary in terms of which BMPs are utilized to protect water quality.

Currently, DOF uses two characterization techniques to track BMP and water quality impacts from forestry operations. Forestry inspectors conduct more than 2,500 inspections annually by visiting sites almost all are visited multiple times. The form used by the inspectors includes determining if the appropriate BMPs have been installed and are installed correctly. The past several years have shown that more than 90 percent of inspections report appropriate use and installation of BMPs. The other characterization technique is a semi-annual audit of 30 randomly selected sites. DOF believes this to be an appropriate indicator that is consistent and measurable. The DOF program combines education and information with an inspection program tied to outcome-based measures. The silvicultural water quality law enables DOF to stop harvesting operations if sediment is entering waterways, recommend corrective actions and impose civil penalties. The semi-annual audit evaluates both BMP implementation and effectiveness levels in the context of identified active water quality impacts.

Virginia recognizes the strong NPS pollution potential from forestry operations throughout the state. Efforts to determine water quality impacts and use of BMPs will continue to be reported. The tracking and monitoring aspects of Virginia's current program are sufficient to identify and address problems as well as provide for making warranted adjustments to how forestry BMP practices are implemented.

For additional NPS program strategies, objectives, and tasks regarding implementation of forestry efforts refer to Chapter VII Forestry.

Urban

The conversion of the land surface from undeveloped open and woodland space to an urbanized setting complete with housing, commercial and transportation infrastructure, causes a significant change in the surface runoff hydrology eliminating opportunities for infiltration and flow attenuation. This developed condition increases the volume and peak flow rate of runoff from rainfall. During the construction process excess runoff can become laden with sediment and nutrients which are then deposited in downstream channels and streams.

The post construction, or developed, condition increase in runoff can cause severe accelerated erosion of stream channel bed and banks, depositing additional sediment and nutrients in the downstream systems, as well as destroying the various habitats found within the stream channel.

The urbanized landscape also collects and stores various urban pollutants such as sediments, nutrients and toxics on impervious surfaces. During storm events these deposited pollutants are quickly and easily flushed from impervious surfaces resulting in potentially high concentrations of pollutant laden runoff. Finally, the urbanizing landscape typically contains an increasing number of privately owned on-site sewage disposal systems which, over time, may release pathogens to the surface runoff.

For additional NPS program strategies, objectives, and tasks regarding implementation of urban efforts refer to Chapter VIII Construction and Development. For watershed efforts refer to Chapter V Watershed Prioritization.

Total suspended solids reductions for new development

There are three main programs that can address the issue of total suspended solids (TSS) in Virginia, the Erosion and Sediment Control (ESC) law, the Chesapeake Bay Preservation Act (CBPA), and the Stormwater Management Act (SMA). The ESC and CBPA are mandatory programs and specifically address land disturbance activities. The SMA is a voluntary program and is only required for state projects and in localities that have a stormwater ordinance.

The ESC program requires every county, city and incorporated town to adopt a local ordinance consistent with the state regulations. The law also requires local government personnel to be trained and certified through the DCR Erosion and Sediment Control Certification Program, which is offered several times a year. The law requires implementation of an approved ESC plan for non-exempt land disturbing activities greater than 10,000 square feet.

The CBPA requires local governments in Tidewater, Virginia to designate Chesapeake Bay Preservation Areas and adopt a land management program based on the Chesapeake Bay Preservation Areas Designation and Management Regulations. Chesapeake Bay Preservation areas include Resource Protection Areas (RPAs) and Resource Management Areas (RMAs). Sensitive features such as tributary streams, shorelines and many wetlands are included in RPAs along with a 100 foot buffer adjacent to these features. The buffer is deemed to achieve a 75 percent reduction in sediments. RMAs are designated contiguous to the entire inland boundary of the RPA, and in many localities include the entire jurisdiction. Within Chesapeake Bay Preservation Areas, the threshold for ESC requirements is reduced from 10,000 to 2,500 square feet of land disturbance. In addition, there are requirements for no-net increase in stormwater pollutant loadings from new development and a 10 percent reduction in stormwater loadings from redevelopment. These requirements can be met through on-site best management practices or through an approved regional stormwater management program. The regulations also require that the site design criteria of minimizing land disturbance and impervious cover, and preserving existing vegetation be incorporated into the local development review process.

The SMA addresses permanent changes in stormwater runoff that result from development and increases in impervious surfaces. The SMA and regulations specify minimum technical and administrative requirements for local programs and state agency projects. It is applicable to development projects that disturb one acre or more. The technical requirements include water quality and water quantity control criteria. Compliance with the SMA is required for state agencies. For localities that choose to adopt a stormwater ordinance, compliance with the minimum criteria is required. Currently, in Tidewater, Virginia, nine localities have adopted stormwater ordinances incorporating the SMA.

Though not specifically targeted at reductions in TSS, the Tributary Strategy process does contribute to this by seeking reductions in nutrients and sediment loads. The Tributary Strategy process relies on local decision-making and public participation to determine solutions to identified problems. The goals are intended to improve water quality, reestablish habitat, including dissolved oxygen, water clarity and underwater grasses, and to restore fish, shellfish, and other living resources. Implementation of the final proposed strategies is voluntary but provides an opportunity to work with localities, counties, and planning district commissions (PDCs) to incorporate the strategies into comprehensive plans, site plan review processes, and stormwater and zoning ordinances.

The Tributary Strategy process in conjunction with continued ESC certification, better levels of enforcement, a tracking database, and NPDES phase II requirements, will allow Virginia to be able to reduce TSS from new development areas. Additionally, it is anticipated that future changes to the stormwater regulations will occur and further strengthen Virginia's ability to address TSS.

Virginia recognizes that TSS is a significant potential source of NPS pollution, however, it is difficult to identify and address TSS when no state or federal standards exist for sediment. Based on the fact that a small percentage of the coastal zone is outside of RPAs and RMAs, Virginia does not consider this program element to have a significant impact. However, efforts will be initiated in 1999 to address TSS reductions in those not included as an RPA or RMA. The main thrust of this effort will be to work with localities outside RPAs and RMAs to develop and implement stormwater management ordinances and plans that reduce runoff from new development.

Priority watershed pollutant reduction and existing development

There are several programs in Virginia that address or support pollution reduction at the watershed level. The Tributary Strategy process, the NPS pollution watershed assessment process, EPA's total maximum daily load (TMDL) program, Section 319 NPS pollution program, the Water Quality Improvement Act (WQIA), the 305(b) report, and the Water Quality Monitoring, Information

and Restoration Act. Development and implementation of stormwater management plans also assist in pollutant reductions. The 303(d) report, which identifies impaired waters, is presented as part of the biennial 305(b) reporting process.

A watershed or hydrologic unit is defined as a land area drained by a river or stream, or system of connecting rivers and streams such that all water within the area flows through a single outlet. In Virginia, 494 individual watershed units have been identified. More than 100 watershed units, in whole or in part, are within the coastal zone. These watersheds are assessed biennially through the *Nonpoint Source Pollution Watershed Assessment* reporting process, which incorporates information on agriculture, forestry and urban loadings. The watersheds are ranked as high, medium or low based on their respective NPS pollution potential. The data collected allows for ranking watersheds due to activities that contribute to NPS pollution.

The assessment presents data relating to agriculture NPS pollution as three types: 1) nutrient loads from agricultural crop, pasture and hay lands; 2) nutrients from agriculturally produced animals; and 3) erosion from agricultural cropland and pasture land. Data presented for urban NPS pollution is identified as nutrient loads from urban areas and erosion from urban lands and construction sites. The forestry rankings are affected by the number of acres subject to silvicultural activity, specifically erosion from harvesting and site preparation.

The Tributary Strategy process will identify specific pollutants to be reduced throughout the Chesapeake Bay Watershed, which encompasses almost all of the coastal zone. The priority pollutants targeted for reduction are nitrogen, phosphorus and sediment. There are several tributary strategies for the major rivers discharging to the Chesapeake Bay, which are the Shenandoah and Potomac, Rappahannock, York, and James rivers. Additional strategies for those smaller drainage basins that discharge directly to the bay will also be developed. Virginia anticipates completion of these strategies in 1999 - 2000. The strategies will identify the level(s) of reduction to be achieved in a specified time period and will be specific to each river basin.

Through the Clean Water Act of 1987, the total

maximum daily load (TMDL), 305(b) report and 303(d) list contain additional information to be utilized by Virginia in promoting watershed planning programs. The 305(b) report describes the current status of all waters in the state. The report is required to monitor and track whether or not waters meet the federal guideline of fishable and swimmable, also known as beneficial uses. The 303(d) list is a list that describes which stream segments do not meet current water quality standards. Those segments not meeting a standard will be listed as "impaired". The reason for the impairment is also provided and categorized as point sources, nonpoint sources or unknown. In addition, the report identifies stream segments that are threatened. These impaired and threatened stream segments are then targeted for pollution abatement or prevention activities.

To further ensure that impaired stream segments are properly addressed, EPA requires states to implement TMDLs in the watershed. A TMDL is intended to identify the maximum levels of pollutant inputs a body of water is capable of receiving while retaining its ability to support living resources and not be a threat to human health. Virginia currently has approximately 500 TMDLs listed for completion (point and nonpoint source) by the year 2010. Approximately one half of these appear to be associated with NPS pollution. For those watersheds where an impaired stream segment exists as a result of NPS pollution, appropriate management measures will be implemented and monitored to determine the effectiveness of the BMPs.

The Virginia Water Quality Improvement Act, in Section 10.1-2127, allows DCR to work with local and state agencies to develop cooperative NPS pollution management programs in defined geographic regions of the state. In response to this, DCR implemented the Cooperative Watershed Initiative (CWI) in 1998. It is anticipated that the CWI will enhance DCR's ability to manage and coordinate its NPS pollution programs. Specific to this program is that it covers the area of the coastal zone in southeastern Virginia that is currently excluded from the Chesapeake Bay Program initiatives. The CWI is designed to be a process driven by the priorities identified by local decision-makers and may result in watershed planning initiatives similar to the Tributary Strategies developed for the Chesapeake Bay watershed. The act also requires annual reports assessing where water quality is demonstrated to be

impaired or degraded as the result of NPS pollution by geographic region.

Based on the numerous programs in Virginia that address priority pollutant reductions and target watershed based activities this element is appropriately addressed. Virginia will incorporate reduction schedules presented in the Tributary Strategy documents and target reduction efforts in high priority watersheds.

Adequate separation distance for on-site sewage disposal systems (OSDS) and limit nitrogen loadings near nitrogen limited surface waters

The current regulations require a permit prior to construction, modification, operation or expansion of a sewage disposal and handling system. If the site does not meet the Sewage Handling and Disposal Regulations, then the permit to construct a septic system is denied. The Chesapeake Bay Preservation Area Designation and Management Regulations require that all existing on-site sewage disposal systems be pumped out at least once every five years. All high maintenance systems are inspected four times a year. Systems located adjacent to shellfish growing waters are inspected every three years and failures are reported for repairs.

In 1998, VDH submitted proposed changes in the regulations, including increasing the minimum separation distance from the water table for new disposal systems, to the Virginia Attorney General's Office. Anticipated changes will result in a minimum separation distance for new systems of 18 inches, regardless of soils or geologic conditions. Additionally, VDH has recently begun to support and promote the upgrading of systems to be more efficient when repairs are made rather than using conventional system replacement parts.

The ability to target OSDS replacement and restrictions to high priority watersheds and impaired waters is limited by the ability to accurately determine what, if any, loadings are the result of failing systems. In many instances, the impacts are localized due to local soil and geologic conditions. However, ongoing studies in Florida may provide some insight to identifying and implementing appropriate approaches to NPS pollution

impacts from OSDS. Currently, Virginia is also conducting analyses regarding NPS pollution through shallow water table studies. The studies are intended to show how variations in the water table affect the reductions of various pollutants. VDH will continue to conduct these studies and evaluate other alternatives for new systems and upgrading and repairing older ones that are failing.

Virginia recognizes that OSDS can be a source of NPS pollution. The state is awaiting results from studies being conducted in Virginia and Florida before taking specific actions. Additionally, there are no nutrient standards in Virginia, which prevents an accurate assessment of how many watersheds or impaired waters could be affected. In conjunction with the anticipated implementation of the new separation distance regulations in the fall of 1999, Virginia will initiate identification of options and approaches for addressing impacts from failing systems. Virginia will also explore alternative incentive and funding tools.

Roads, highways, and bridge runoff systems for roads

All state road construction projects are required to comply with the Virginia Stormwater Management Act and Regulations and the state Erosion and Sediment Control law for new development and facility upgrades. The Virginia Department of Transportation (VDOT) annually submits proposed stormwater runoff standards and technical specifications to DCR for review and approval. In addition, many VDOT personnel attend the workshops and training classes offered by DCR regarding these laws and techniques applicable to meeting the regulatory requirements.

Construction projects that are improvements, such as resurfacing, realignment, expansions or drainage projects, are evaluated to identify problems associated with runoff. For those projects with identified problems, VDOT implements stormwater runoff controls. These controls are based on the annually approved standards and specifications. VDOT has a Roadside Development Manual and a Maintenance Division Manual to direct highway projects. The ability to target specific projects for NPS pollution abatement is limited by the five-year capital improvement plan process VDOT relies on to direct project funding. Associated impacts are not identified until the project process is initiated.

Additional enhancements to the current process will be derived from the Tributary Strategy process, which will identify priority pollutants and a schedule to meet projected reductions. The Tributary Strategy planning documents are anticipated to be completed during the year 2000. Any required reductions will be incorporated into programs designed to address stormwater runoff. Additional efforts may be deemed necessary to reduce NPS pollution in high priority watersheds.

Virginia recognizes the significant potential for NPS pollution from roads, highways and bridges. Efforts will be initiated in 1999 to develop a protocol that incorporates the need to address NPS pollution in high priority watersheds and the schedules prepared for VDOT capital improvement plans. A tracking protocol will be developed that lists locations of projects requiring runoff abatement. In conjunction with other data Virginia's ability to monitor load reductions will be enhanced.

Runoff systems for local roads not within the Chesapeake Bay Preservation Areas

Currently, local roads are not required to meet the stormwater design standards and specifications of the two manuals used by VDOT. However, local roads are required to adhere to the ESC requirements and regulations, which abate NPS pollutant loadings during construction. In addition, local road construction must also adhere to the stormwater management ordinance in localities that have adopted an ordinance.

However, there are questions regarding the significance of NPS pollution impacts from local roads outside of RPAs and RMAs. As presented in the 1995 program document, approximately 80 percent of the coastal zone is within a RPAs and RMAs. Another way to state this is that only 20 per cent of the roads in the coastal zone are not addressed by one of these designations. Furthermore, not all roads outside CBPAs are local and some portion of what are considered to be local roads will be subject to local stormwater management ordinances, which would meet the management measures. It is also noted that some local roads are designed to meet VDOT standards with the intent of handing the road over to VDOT when a particular development is complete.

Virginia does not consider those local roads not addressed by the CBPA regulations to present a significant source of NPS pollution. This program element should be excluded from the management measures as a program condition. Virginia recognizes that some localized level of impact may exist and will address this element through the CZARA “additional management measure” approach. As an additional management measure Virginia will prepare GIS-based data to further support this position and will identify those localities with stormwater management ordinances for areas outside RPAs and RMAs. For those localities without a stormwater management ordinance, Virginia will actively seek development and adoption of an ordinance.

Virginia recognizes the potential for NPS pollution in the form of runoff from local roads. However, it does not appear to be a significant source due to the small percentage of local roads not currently addressed through CBLAD and VDOT regulations. To more accurately depict the potential for runoff potential Virginia will conduct an analysis during the first five-year planning period to determine what percentage of local roads outside of RPAs and RMAs actually exist.

Marinas and Recreational Boating

The majority of recreational and commercial boating activity occurs within the Chesapeake Bay and its tributaries. Marina and boat operations are also located along the Atlantic coast and on Virginia's inland lakes. A 1990 Virginia Department of Health (VDH) survey identified 773 facilities that can be classified as either marinas or boat moorings. Marina and boat operations are responsible for a relatively small percentage of the total pollutant load affecting Virginia's coastal waters. However, marina and boat activities can contribute significantly to local pollution problems.

Marinas and boat operations are sources of a variety of pollutants that can degrade water quality including sewage, erosion, habitat degradation, petroleum products, boat paint, and litter and other debris. The most serious problem is created by the improper handling of human waste at marinas and discharge of such waste from vessels. Water quality problems associated with human waste include excessive nitrification, which can lead to the depletion of dissolved oxygen, and health hazards posed by the presence of pathogenic organisms.

Stormwater runoff from hull maintenance operations

There are several state agency programs available to marina owners and operators that address all management measures except for stormwater runoff from hull maintenance facilities. The current permitting processes address hull maintenance facilities when new facilities are constructed or existing facilities make modifications. Those existing facilities that do not make modifications are not addressed.

Virginia recognizes the gap in technical and financial assistance available to existing hull maintenance facilities. Efforts will be initiated in 1999 to assess alternative approaches to address this issue. It is anticipated that, at a minimum, technical assistance will be provided through the development of a marina BMP manual and outreach efforts. This is to be achieved through the creation of a Marina Technical Advisory Service (MTAS). The MTAS will be located at the Virginia Institute of Marine Science (VIMS) at William and Mary College. VIMS currently houses the Virginia Sea Grant program and offers an opportunity to

coordinate two NOAA programs. To expedite these efforts, primary consideration may be given to pursuing assistance to those facilities located in high priority watersheds or impaired waters.

Fish waste

Fish waste is considered a solid waste, but the proper disposal of fish is not specifically addressed in current permit processes or adequately addressed through boater education programs. However, Virginia's solid waste regulations and Virginia Water Protection Permits specifically require the proper disposal of solid waste into an approved facility. The *Code of Virginia* further states that it is unlawful to cast any waste into state waters unless it is for fish or crab bait. Therefore, fish is statutorily addressed in permits because it is defined as solid waste, and solid waste must be disposed of properly.

Virginia recognizes the need to provide technical and educational assistance to marina owners and operators and recreational boaters regarding the disposal of fish waste. However, Virginia does not consider fish waste to be a significant source of NPS pollution, though there may be local or seasonal impacts. Information will be developed by the MTAS and provided to marina owners and operators and recreational boaters. To expedite these efforts, primary consideration may be given to focusing on those facilities located in high priority watersheds or impaired waters.

A process to provide sufficient technical assistance for marina development and operation

Virginia currently provides several technical and financial assistance programs through several agencies. However, it was determined that additional assistance was needed for marina owners and operators. Specifically, additional assistance in the area of development and operation was identified. The joint permit process provides some support through project reviews, which can result in changes to the location and operation of marinas. The same is true for the site plan review process from local governments. Neither of these activities is intended to be provided from an assistance standpoint and do not fully address the intent for technical assistance for development and operation.

In 1999, a pilot program will be created at the College of William and Mary. In conjunction with NOAA's Sea Grant program at the Virginia Institute of Marine Science, a Marina Technical Advisory Service will be initiated to provide technical assistance to marina owners and operators. This service will address other CNPSPC priorities as described above for fish waste and stormwater runoff from hull maintenance facilities. An advisory committee will also be developed and will include agency, citizen and industry representatives.

Hydromodification

Hydrologic modification is the alteration of stream flow by human activities. All hydrologic modifications, whether properly or improperly implemented, may result in nonpoint source (NPS) pollution to the waters of the Commonwealth of Virginia, and impact aquatic and riparian habitat.

The principle NPS pollution resulting from hydrologic modification is sediment. However, nutrients and toxics may also be associated with the sediment produced by these activities.

Watershed development and disturbances to riparian areas may result in:

- C increased streambank or shoreline erosion,
- C water quality degradation, and
- C destruction of sensitive aquatic habitat.

In particular, channel modifications undertaken in streams or rivers to straighten, relocate or change the depth or width of a channel can alter

- C instream water temperature,
- C the physical and chemical characteristics of bottom sediments,
- C the rate and characteristics of sediment, and
- C flooding frequencies of downstream property.

In addition, channel modifications often require maintenance dredging, which can diminish the suitability of aquatic and riparian habitat for fish and wildlife. While some adverse impacts associated with channel modification activities may be temporary, the loss of habitat and the need for ongoing maintenance can have significant long-term consequences.

Siting, constructing and operating dams and impoundments can result in significant changes in the ecology of streams and rivers. The construction of dams may result in considerable increases in nonpoint source pollution such as increased sediment loading and chemical contaminants. Dam operation can produce

changes in water temperature and water chemistry (pH and dissolved oxygen). In addition, dams and impoundments can disrupt the natural transport of sediment and can result in significant changes to instream flow.

For additional NPS program strategies, objectives, and tasks regarding implementation of hydromodification efforts refer to Chapter XI Hydromodification.

Process to improve surface water quality and restore instream and riparian habitat through the operation and maintenance of existing modified channels

Virginia requires a permit for all channelization projects, and considers impacts to water quality, floodplain, endangered species, and erosion and sediment control. The Joint Permit Application program, which is coordinated by the Virginia Marine Resources Commission (VMRC), is a process for federal and state agencies to comment on potential impacts of proposed projects within waters and wetlands of the state. In cases where impacts are considered significant, modeling may be required prior to any activity. Through Virginia's programs, primary and secondary impacts from channel modifications are assessed. The programs meet all statutory requirements. However, it is not clear if this process is sufficient to address other opportunities for restoration or improvements in water quality.

Currently, there are two programs that will assist in addressing this program element. The Chesapeake Bay Program recently developed a 2010 Riparian Restoration Initiative. This program is intended to conduct riparian restoration activities on 2010 miles of stream and shoreline in the Chesapeake Bay Watershed. Virginia's commitment for this program is 610 square miles of restoration. Another program is under development by DCR and the Natural Resources Conservation Service (NRCS) and is known as the Conservation Reserve Enhancement Program. This program is intended to support riparian restoration and filter strips on 35,000 acres throughout Virginia. In addition, the Agricultural BMP Cost-Share Program supports efforts to install BMPs.

It is unclear just exactly what the extent of opportunity for habitat improvement may be. Virginia recognizes the

likelihood that some localized opportunities exist. To further evaluate this, a stratified random sample survey and quantitative habitat analysis of channel operation and maintenance will be conducted in the coastal zone during 1999-2000. If the study results show that significant opportunity exists for restoration activities pertaining to channel operation and maintenance a process will be developed for implementation. In addition, Virginia will work closely with NRCS and the EPA Chesapeake Bay Program to ensure that some of the restoration activities available through their programs will occur within the coastal zone.

Manage the operation of dams to protect surface water quality and instream and riparian habitat, and to assess nonpoint source pollution problems resulting from excessive surface water withdrawals

Virginia requires a permit for all dam construction projects, and considers impacts to water quality, floodplain, endangered species, and erosion and sediment control. Through Virginia's programs, primary and secondary impacts from dams are assessed. The programs meet all statutory requirements. However, it is not clear if this process is sufficient to address other opportunities for restoration or improvements in surface water quality.

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maintenance will be conducted in the coastal zone during 1999-2001. If the study results show that significant opportunity exists for restoration activities pertaining to dam operation and maintenance a process will be identified for implementation. In addition, Virginia will work closely with the NRCS and EPA Chesapeake Bay Program to ensure that restoration activities available through their programs will occur within the coastal zone.

A process to identify and develop strategies to solve existing nonpoint source pollution problems caused by streambank or shoreline erosion that do not come up for review under existing permit authorities

There are several programs in Virginia that address erosion, two of which are non-permit oriented. The Shoreline Erosion Advisory Service (SEAS) is a voluntary program whereby a property owner initiates the activity. The property owner makes a request to SEAS to come inspect an erosion problem. SEAS staff conduct an inspection and provide a report to the property owner that details what steps can be taken to address the problem. It is then up to the owner to initiate remediation. In most instances, the property owner will need a permit prior to any construction activities.

The Chesapeake Bay Local Assistance Department (CBLAD) Comprehensive Plan process is the only program that meets the requirement for solving existing problems that do not come up for review under existing permit authorities. CBLAD requires that comprehensive plans include a program element specifically addressing areas of erosion as well as existing structures for shorelines and streambanks. A locality must identify areas of erosion, determine if it is a problem (based on performance criteria) and develop a strategy to resolve the problem.

The locality needs to reflect the comprehensive plan recommendations through the zoning ordinance to ensure implementation of the plan. This process allows Virginia to address erosion induced NPS pollution that is not triggered by a permitting process. Additionally, the comprehensive plan process, in conjunction with the CBPA performance criteria for buffers, SEAS technical assistance, riparian restoration initiatives, and the Agricultural BMP Cost-Share Program, Virginia has an

adequate number of tools at its disposal to address erosion issues independent of permitting actions.

Though Virginia has the tools available to address erosion, there is recognition for ways to improve and enhance current efforts. There are several BMP manuals that have been developed over the years that need to be reviewed and updated. The various agencies involved in permit and non-permit activities need to coordinate programs more closely. There is an identified need for updated information for shoreline and streambank erosion rates that can be addressed through updating previous reports. This will provide a level of comparative analysis and provide needed technical assistance to the localities. In addition, Virginia will work closely with the NRCS and EPA Chesapeake Bay Program to ensure that restoration activities available through their programs will occur within the coastal zone.

Wetlands, Riparian Areas and Vegetated Treatment Systems

Wetlands provide many ecological and socio-economic benefits including water quality improvement, aquatic productivity, fish and wildlife habitat, shoreline erosion control, stormwater treatment, flood protection, recreation, and economically valuable resources. Wetlands occupy a strategic position between upland and aquatic environments providing the opportunity to trap and filter NPS pollutants from upland runoff prior to entering adjacent waters.

As such, wetlands serve a variety of functions throughout the coastal zone. Wetlands provide spawning, nesting, shelter and nursery areas for fish and wildlife. Additionally, studies have shown that almost two thirds of all commercially harvested fish and shellfish species are associated with wetlands. Furthermore, recreational hunting and fishing interests as well as tourism are dependent upon wetlands.

Monitoring and Tracking

Water quality monitoring and tracking of nonpoint source pollution control implementation are essential elements of Virginia's Nonpoint Source Pollution Management Program. Monitoring and tracking support and direct program activities by providing information on water quality and the health of water resources. The Department of Environmental Quality (DEQ) administers the state ambient water quality and fall line monitoring programs. The Department of Conservation and Recreation (DCR) is the lead state agency for supporting and tracking nonpoint source (NPS) pollution control implementation. Both DCR and DEQ support citizen monitoring efforts in Virginia. Identifying water quality problems and the sources of impairment is a major focus of Virginia's water quality monitoring program.

Historically, Virginia has focused monitoring efforts on point source discharges. Although DEQ has relocated many of its monitoring stations and expanded its monitoring network to enhance ambient water quality data collection and support nonpoint source pollution monitoring needs, the placement of monitoring stations continues to reflect a point source bias. A key challenge to Virginia monitoring programs will be to ensure that the location and design of monitoring stations reflect the increasing focus on reducing nonpoint sources of water pollution.

Lack of stream flow data and data consistency have also been identified as significant monitoring issues. As Virginia moves forward with developing total maximum daily loads (TMDLs) for streams impaired by nonpoint sources of pollution, data consistency and the availability of flow data will be essential for analyses of pollutant load allocations.

A plan to assess over time the success of the management measures in reducing pollution loads and improving water quality

There are several programs in Virginia that conduct monitoring and tracking throughout the coastal zone and the state as a whole. DEQ is responsible for preparing the 305(b) report on the quality of the state's waters. The information in this report is collected through more than 2,000 monitoring stations. The DCR Agricultural

BMP Cost-Share Program tracks the installation of BMPs by latitude and longitude coordinates. Other state agencies that provide support are CBLAD, DOF, Department of Game and Inland Fisheries (DGIF), Department of Mines, Minerals, and Energy (DMME), VCE, and VDH. Federal agencies that provide support are NRCS and the U.S. Geological Survey (USGS).

Virginia's monitoring and tracking programs, and accessibility to other state and federal data, are sufficient to allow monitoring and tracking of the implementation of the CZARA management measures. Additionally, many programs contain scheduled reporting requirements. The main impediment to meeting this program element is the lack of an identified reporting process that relates other state and federal program activities to implementation of the CNPSPC program.

The Monitoring, Tracking, Assessment and Watershed Prioritization Chapter of this document identifies a series of specific actions to be taken incorporating physical, chemical and biological parameters. This information will be critical in allowing Virginia to assess the effectiveness of its CNPSPC program.

For additional NPS program strategies, objectives, and tasks regarding implementation of monitoring and tracking efforts refer to Chapter IX Monitoring and Tracking.

OBJECTIVES, STRATEGIES & TASKS

The implementation strategies and tasks are presented in a format that recognizes the overall 15-year planning horizon of the Administrative Changes provided in October 1998 and the Additional Guidance provided in March 1999 by NOAA. The tasks within each source category are mainly presented chronologically by the year in which it is anticipated to be completed. In most instances the tasks are not hierarchical, rather these time frames are presented in terms that are considered to be realistic and basically independent actions to support strategy implementation and achievement of the objectives. It is anticipated that program reviews will be

conducted at a minimum of five-year intervals. The program review element is not included in the tables, however, within a category a particular strategy or task may require this.

In general terms, the overall approach is to focus on watersheds with the most severe nonpoint source pollution problems. This approach will allow Virginia to incorporate and integrate information from other programs such as the Tributary Strategy process, the Agricultural BMP Cost-Share Program and the Chesapeake Bay Program. It also provides a program support mechanism through targeting funds to areas that are receiving other program funds, such as the Section 319 statewide nonpoint source program, Chesapeake Bay Local Assistance Department funds, the state Water Quality Improvement Fund, or the Chesapeake Bay Implementation Grant. By coordinating efforts where they are most needed Virginia expects to achieve significant improvements in water quality. In addition, this level of program integration and coordination will assist in meeting the objectives of the Clean Water Action Plan.

Many of the strategies and tasks presented in the preceding chapters are relevant to the issues presented in this chapter. Though the strategies and tasks of the preceding chapters are not repeated verbatim in this chapter, where appropriate they are reflected in the strategies and tasks presented in the tables below. The reason for this is that the Section 319 and Coastal NPS pollution programs differ slightly in their respective reporting and implementation requirements. However, it is sensible to present both in a single document under the umbrella of a statewide NPS pollution management program. In comparing the two programs, some of the strategies and tasks presented in this document are mutually exclusive, while most are mutually supportive. Specifically, the Watershed Prioritization, Agriculture, Forestry, Construction and Development, Monitoring and Tracking, and Hydromodification Chapters detail additional objectives, strategies, and tasks that will contribute to the implementation of the management measures within the coastal zone. Where feasible and appropriate the 319 and Coastal NPS program efforts will be coordinated as described in Chapters XII and XIV. These efforts will be detailed in future reports evaluating program implementation activities.

MANAGEMENT MEASURES

The listing of program elements is not intended to represent any prioritization of effort, rather it follows the sequence of categories used in the NOAA and EPA *Guidance for Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* and Virginia's *Coastal Nonpoint Source Pollution Control Program* submitted in October 1995. Similarly, the listing of multiple participants for achieving program tasks are alphabetical and are not intended to represent any particular priority or level of responsibility. Participants are listed based on the fact that the agency has an interest and a role in accomplishing implementation of the strategy or task.

In many instances a funding source has not been identified. It is inappropriate to obligate a funding source prior to having implementation mechanisms in place. As the program and participants move forward, funding sources will be identified and targeted for achieving full program implementation.

Management Measure: Irrigation Water Management

| OBJECTIVE 1 | | | | |
|---|--|---|--------------------|-------------------------|
| <i>Improve the irrigation management skills of Virginia irrigators in order to protect Virginia's surface and groundwater resources</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 1.1 Improve the awareness of irrigators with respect to NPS pollution risks | Update irrigation technical assistance documents and distribute to irrigators, SWCDs, local governments and other appropriate agencies | •CBLAD •DCR •DEQ •VCE | 1999 - 2001 | •General Fund •CZARA |
| 1.2 Promote pollution abatement through implementation of appropriate BMPs | Update irrigation technical assistance documents and distribute to irrigators, SWCDs, local governments and other appropriate agencies | •DCR •DEQ •VPI&SU •VDACS | 1999 - 2001 | •General Fund •CZARA |
| | Conduct a series of workshops throughout the coastal zone targeting irrigators, regulators, environmental planners, and local government officials | •DCR •DEQ •VPI&SU •VCE •VDACS | 1999 - 2001 | •General Fund •CZARA |
| | Work with academic institutions to identify options for short courses, off-site learning, and other education initiatives that can be made available to irrigators | •DCR •VPI&SU •VCE •VDACS | 1999 - 2002 | •Unknown |
| | Evaluate development of an irrigation advisory service through local VCE offices to enhance irrigation water management, including a tracking system to determine effectiveness of program | •DCR •DEQ •VCE •VDACS | 1999 - 2002 | •Unknown |
| 1.3 Provide education and technical assistance to irrigators | | •DCR •SWCDs •VCE •VDACS | Annually 2001-2014 | •Unknown |

Management Measure: Forestry

| OBJECTIVE 2 | | | | |
|--|---|-----------------------------------|----------------------|-----------------|
| <i>Promote and support reduced water quality impacts and the use of best management practices (BMPs) for forestry operations</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 2.1 Achieve a 93 percent rate for forestry operation sites where no water quality impacts occur by 2004 | Where water quality impacts occur, enforce corrective BMP measures to include follow-up site visits | •DOF | 1999-2004 | •DOF |
| | Conduct site assessments through the semi-annual audit and determine if a water quality impact has occurred | •DOF | Annually 2000-2014 | •DOF |
| 2.2 Maintain a 90 percent rate for implementing appropriate BMPs through site inspections | Incorporate BMP location information into NPS pollution watershed assessment database | •DCR •DOF | 1999-2004 | •DCR •DOF |
| | Continue to conduct training workshops annually | •DOF •Virginia Forestry Assoc. | 1999-2004 | •DOF •VFA |
| | Conduct site inspections to determine if appropriate BMP are installed | •DOF | Annually 1999 - 2014 | •DOF |

Management Measure : Total suspended solids outside of the Chesapeake Bay Preservation Areas for new development

| OBJECTIVE 3 | | | | |
|--|--|---------------------------------|--------------------|--------------------------------|
| <i>Develop stormwater management plans throughout the coastal zone</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 3.1 Achieve an 80 percent reduction in TSS throughout coastal Virginia from new development. | Conduct reviews of current programs to determine effectiveness | •DCR •DEQ •PDCs •CBLAD | 1999-2001 | •Unknown |
| | Demonstrate to localities economic efficiencies of implementing stormwater management practices by evaluating actual projects and conducting comparative analyses of costs | •DCR •CBLAD | 1999-2001 | •CZARA |
| | Incorporate NPDES phase II requirements where appropriate | •DCR •DEQ | 1999-2002 | •Unknown |
| | Develop a tracking database/spreadsheet that incorporates DEQ, DCR and CBLAD local program and permit tracking information | •CBLAD •DCR •DEQ | 1999-2003 | •CZARA |
| | Assist localities in high priority watersheds to develop and implement stormwater management plans | •CBLAD •DCR •PDCs | 1999-2004 | •CZARA •General Fund |
| | Assist localities in incorporating recommendations from the Tributary Strategy process | •CBLAD •DEQ •DCR •PDCs | 1999-2004 | •Unknown |
| | Work with the Natural Resources Conservation Service Conservation Reserve Enhancement Program to target riparian restoration efforts | •DCR •DOF •NRCS •SWCDs | 1999-2004 | •NRCS •DCR •General Fund |

| OBJECTIVE 3 (Cont.) | | | | |
|--|---|---|--------------------|-------------------------------|
| <i>Develop stormwater management plans throughout the coastal zone</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 3.1 (Cont.) 80 percent reduction in TSS | Work with federal, state and local agencies to target riparian restoration activities for the Chesapeake Bay Program Riparian Restoration initiative for 610 miles of restoration by 2010 | •CBLAD •DCR •DOF •EPA •NRCS | 1999-2009 | •DCR •DOF •EPA •NRCS |
| | Assist localities in medium priority watersheds to develop and implement stormwater management plans | •CBLAD •DCR •PDCs | 2004-2009 | •Unknown |
| 3.2 Improve administration of Erosion and Sediment Control law through enhanced technical assistance, increased enforcement and improved coordination among agencies | Conduct three training and certification courses annually for Erosion and Sediment Control for plan reviewers, engineers, local E&S staff | •CBLAD •DCR •DEQ •Local governments •PDCs | Annually 1999-2014 | •Unknown •DCR |
| | Work with appropriate agencies to craft legislation for additional stormwater management measures | •CBLAD •DCR •DEQ •Local governments •PDCs | 1999-2014 | •Agencies •Unknown |
| | Assist localities in low priority watersheds to develop and implement stormwater management plans | •CBLAD •DCR •PDCs | 2009-2014 | •General Fund |

Management Measure : Priority watershed pollutant reduction opportunities

| OBJECTIVE 4 | | | | |
|--|--|---|--------------------|-------------------------------|
| <i>Improve water quality in those watersheds most in need of restoration and nonpoint source pollution reduction actions</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 4.1 Target high priority watersheds and impaired waters to reduce NPS pollution | Begin incorporation of Tributary Strategy recommendations into watershed planning process | •CBLAD •DEQ •DCR •PDCs | 1999-2002 | •Agencies |
| | Identify high priority watersheds and impaired waters and work with local governments to analyze impacts from existing development | •CBLAD •DCR •DEQ •PDCs | 1999-2003 | •Unknown |
| | Track NPS pollution TMDL activities in the coastal zone to analyze effectiveness of implementation of management measures | •CBLAD •DCR •DEQ | 1999-2004 | •Unknown •DCR |
| | Work with the Natural Resources Conservation Service Conservation Reserve Enhancement Program | •DCR •DOF •NRCS •SWCDs | 1999-2004 | •DCR •DOF •EPA •NRCS |
| | Work with localities to incorporate monitoring and maintenance procedures to determine efforts to reduce priority pollutants | •CBLAD •DCR •DEQ •EPA •Local governments •PDCs •SWCDs | 1999-2004 | •Unknown |

| OBJECTIVE 4 (Cont) | | | | |
|--|---|---|-------------|---|
| <i>Improve water quality in those watersheds most in need of restoration and nonpoint source pollution reduction actions</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 4.1 (Cont.) Target high priority watersheds and impaired waters | Develop watershed management plans | <ul style="list-style-type: none"> •DCR •DEQ •Local governments •PDCs | 1999-2004 | •Unknown |
| | Assist localities in incorporating recommendations from the Tributary Strategy and Cooperative Watershed Initiative processes | <ul style="list-style-type: none"> •CBLAD •DEQ •DCR •PDCs | 1999-2004 | •Agencies |
| | Work with federal, state and local agencies to target riparian restoration activities for the Chesapeake Bay Program Riparian Restoration initiative for 610 miles of restoration by 2010 | <ul style="list-style-type: none"> •DCR •DOF •EPA •NRCS | 1999-2009 | <ul style="list-style-type: none"> •DCR •DOF •EPA •NRCS |
| 4.2 Continue annual Water Quality Improvement Act reporting to the governor and General Assembly on geographically impaired or degraded waters | | <ul style="list-style-type: none"> •DCR •DEQ | 1999-2014 | •WQIF |

Management Measure: Adequate separation distance between new on-site disposal systems (OSDS) and groundwater closely hydrologically connected to surface water and limiting nitrogen loadings from new and operating on-site disposal systems near nitrogen limited surface waters

| OBJECTIVE 5 | | | | |
|---|--|--|-------------|-----------------|
| <i>Reduce existing on-site sewage disposal systems (OSDS) impacts to water quality and prevent impacts from new systems</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 5.1 Increase the separation distance from the current minimum of two inches for new OSDS | Implement regulations requiring a minimum separation distance of 18 inches without pretreatment | •VDH | 1999-2001 | •VDH |
| 5.2 Limit nitrogen loadings to nitrogen impaired waters | Evaluate the feasibility of requiring system inspections upon the sale of property | •CBLAD •DCR •Local health dept's •VDH | 1999-2002 | •Unknown |
| | Evaluate options for cost-sharing or tax incentives to replace or upgrade older OSDS | •CBLAD •DCR •Local health dept's •VDH | 1999-2002 | •N/A |
| | Continue to promote the use of new innovative techniques for OSDS through local health departments | •CBLAD •DCR •DEQ •VDH | 1999-2004 | •N/A |
| | Target efforts, based on the results of ongoing studies, to identify economically achievable options for targeting efforts to high priority watersheds or where there are NPS pollution impairments for nitrogen | •CBLAD •DCR •DEQ •VDH | 1999-2004 | •Unknown |

| OBJECTIVE 5 (Cont.) | | | | |
|---|---|---|-------------|-----------------|
| <i>Reduce existing on-site sewage disposal systems (OSDS) impacts to water quality and prevent impacts from new systems</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 5.2 (Cont.) Limit nitrogen loadings to nitrogen impaired waters | Review effectiveness of efforts by conducting a random sample analysis of projects completed between 1999 and 2003 to include sampling on and offsite | <ul style="list-style-type: none"> •CBLAD •DCR •DEQ •VDH | 2003-2004 | •Unknown |
| 5.3 Apply five-year pump-out requirements in coastal areas outside of the Chesapeake Bay Preservation Areas | | <ul style="list-style-type: none"> •DCR •Local health dept's •PDCs •VDH | 1999-2002 | •Unknown |
| 5.4 Continue to provide educational materials to the public about inspecting, maintaining and upgrading septic systems | | <ul style="list-style-type: none"> •DCR •Local health dept's •PDCs •VDH | 1999-2014 | •General Fund |

Management Measure: Roads, highways, and bridge runoff systems

| OBJECTIVE 6 | | | | |
|---|--|------------------------------|--------------------|------------------------|
| <i>Reduce runoff from roads, highways, and bridges</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 6.1 Target implementation of runoff systems in high priority watersheds | Work with VDOT to identify activities listed in their capital improvement plans by the 14-digit hydrologic unit code in relation to watershed prioritization | •DCR •VDOT | 1999-2004 | •N/A |
| 6.2 Prepare list of projects by watershed | Develop a tracking system that shows where runoff is being reduced | •DCR •VDOT | 1999-2002 | •N/A |

Management Measure: Runoff systems for local roads not within the Chesapeake Bay Preservation Areas

| OBJECTIVE 7 | | | | |
|---|---|------------------------------|--------------------|------------------------|
| <i>Reduce runoff from local roads outside Chesapeake Bay Preservation Areas</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 7.1 Reduce runoff from local roads | Identify localities whose stormwater management ordinances affect local roads outside CBPAs | •CBLAD •DCR | 1999-2001 | •Unknown |
| | Quantify extent of local roads outside of CBPAs | •CBLAD •DCR •PDCs | 1999-2003 | •Unknown |
| 7.2 Assist localities to develop stormwater management ordinances | | •CBLAD •DCR | 1999-2004 | •DCR •CZARA |

Management Measure: Stormwater runoff from hull maintenance operations

| OBJECTIVE 8 | | | | |
|--|--|--------------------------------------|-------------|-----------------|
| Reduce runoff from hull maintenance facilities | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 8.1 Develop and implement a technical assistance program | Provide technical guidance through the development of a Marina BMP manual | •DCR •DEQ •Sea Grant •VMRC | 1999-2001 | •CZARA |
| | Develop hull maintenance BMP installation tracking program | •DCR •DEQ •Sea Grant •VMRC | 1999-2001 | •CZARA |
| | Evaluate stormwater management ordinances for localities with hull maintenance facilities for implementation effectiveness | •CBLAD •DCR •DEQ •Sea Grant | 1999-2002 | •CZARA |
| | Evaluate need to focus on high priority watersheds or impaired waters | •DCR •DEQ •Sea Grant •VMRC | 2002-2003 | •CZARA |

Management Measure : Proper disposal of fish waste

| OBJECTIVE 9 | | | | |
|--|--|-------------------------------------|-------------|-----------------|
| <i>Reduce potential NPS pollution from improper disposal of fish waste</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 9.1 Develop and implement an education and outreach program for marina owners and operators and recreational boaters | Provide technical guidance through the development of a Marina BMP manual | •DCR •DEQ •Sea Grant •VMRC | 1999-2000 | •CZARA |
| | Develop education materials that can be provided to boaters, recreational and sports fishing organizations and local officials | •DCR •DEQ •Sea Grant •VMRC | 1999-2001 | •CZARA |
| | Evaluate need to focus on high priority watersheds or impaired waters | •DCR •DEQ •Sea Grant •VMRC | 2002-2003 | •Unknown |
| 9.2 Expand use of fish cleaning stations and receptacles | | •DEQ •DCR •VMRC •Sea Grant | 1999-2014 | •Unknown |

Management Measure : A process to provide sufficient technical assistance for marina development and operation

| OBJECTIVE 10 | | | | |
|--|---|--------------------------------------|-------------|-----------------|
| <i>Enhance technical assistance for development and operation to marina owners and operators</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 10.1 Convene an Advisory Committee | | •DCR •DEQ •Sea Grant •VMRC | 1999-2001 | •N/A |
| 10.2 Create a technical advisory service | Define role of staff and service priorities | •DCR •DEQ •Sea Grant •VMRC | 1999-2000 | •CZARA |
| | Hire a marine technical specialist | •DCR •DEQ •Sea Grant •VMRC | 1999-2000 | •CZARA |
| | Develop a marina BMP manual | •DCR •DEQ •Sea Grant, •VMRC | 1999-2000 | •CZARA |

| | Provide technical assistance to marina owners and operators, consultants, businesses and environmental groups in the coastal zone regarding social and economic, regulatory compliance, siting and design criteria, coastal hazard mitigation, fish waste, stormwater runoff, boat operation, and public health and safety issues | •DCR •DEQ •Sea Grant •VMRC | 1999-2000 | •CZARA |
|--|---|-------------------------------------|-------------|-----------------|
| OBJECTIVE 10 (Cont.) | | | | |
| <i>Enhance technical assistance for development and operation to marina owners and operators</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 10.3 Conduct program review and identify priorities for 2001-2004 | | •DCR •DEQ •Sea Grant •VMRC | 2000-2001 | •N/A |

Management Measure A process to improve surface water quality and restore instream and riparian habitat through the operation and maintenance of existing modified channels

| OBJECTIVE 11 | | | | |
|---|---|-------------------|-------------|-----------------|
| <i>Improve surface water quality, and instream and riparian habitat</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 11.1 Identify the extent to which opportunities exist | Conduct a stratified random sample survey of areas of channel operation and maintenance | •DCR •DEQ | 2000-2001 | •CZARA |

| | | | | |
|---|--|--|-----------|-------------------------------|
| | Develop protocol for identifying opportunities incorporating results of sample survey into permit/review processes | •DCR •DEQ •DGIF •NRCS •VDOT •VMRC | 2001-2002 | •CZARA |
| 11.2 Work with the Natural Resources Conservation Service Conservation Reserve Enhancement Program to target riparian restoration efforts | | •DCR •DOF •NRCS •SWCDs | 1999-2004 | •NRCS •DCR |
| 11.3 Work with federal, state and local agencies to target riparian restoration activities of the Chesapeake Bay Program Riparian Restoration initiative for 610 miles of restoration by 2010 | | •DCR •DOF •EPA •NRCS | 1999-2009 | •DCR •DOF •EPA •NRCS |

Management Measure : Manage the operation of dams to protect surface water quality and instream and riparian habitat and to assess nonpoint source pollution problems resulting from excessive surface water withdrawals

| OBJECTIVE 12 | | | | |
|---|--|--|-------------|-------------------------------|
| <i>Improve surface water quality, and instream and riparian habitat</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 12.1 Identify the extent to which opportunities exist | Conduct a stratified random sample survey of areas of dam operation and maintenance | •DCR •DEQ | 1999-2000 | •CZARA |
| | Develop protocol for identifying opportunities incorporating results of sample survey into permit and/or review processes | •DCR •DEQ •DGIF •NRCS •VDACS •VDOT •VMRC | 2000-2001 | •CZARA |
| | Work with the Natural Resources Conservation Service Conservation Reserve Enhancement Program to target riparian restoration efforts | •DCR •DOF •NRCS •SWCDs | 1999-2004: | •DCR •DOF •EPA •NRCS |

| | | | | |
|---|--|--|-----------|---|
| 12.2 Work with federal, state and local agencies to target riparian restoration activities of the Chesapeake Bay Program Riparian Restoration initiative for 610 miles of restoration by 2010 | | <ul style="list-style-type: none"> •DCR •DOF •EPA | 1999-2009 | <ul style="list-style-type: none"> •DCR •DOF •EPA •NRCS |
|---|--|--|-----------|---|

Management Measure : A process to identify and develop strategies to solve existing nonpoint source pollution problems caused by streambank or shoreline erosion that do not come up for review under existing permit authorities

| OBJECTIVE 13 | | | | |
|--|--|---|-------------|------------------------------|
| <i>Enhance existing non-permit-based streambank and shoreline erosion control programs</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 13.1 Support development of shoreline and streambank erosion documents | Enhance shoreline and streambank structural information for technical assistance to localities | •CBLAD •DCR •DEQ •DGIF •VMRC | 1999-2001 | •CBLAD •CZARA •Unknown |
| | Initiate and complete an update of a state study identifying locations and rates of erosion | •CBLAD •DCR •DEQ •DGIF •VDACS •VMRC | 2000-2002 | •CBLAD •CZARA |
| | Conduct interagency review and update appropriate BMP manuals | •CBLAD •DCR •DEQ •DOF •NRCS •VDOT •VMRC | 2000-2003 | •Unknown |
| | Enhance public awareness of Shoreline Erosion Advisory Service through outreach efforts and publication distribution | •DCR | 1999-2014 | •DCR |
| 13.2 Enhance agency coordination regarding permits and data incorporation | Develop and implement an MOU between DCR and CBLAD to define a protocol for incorporating respective information into each program | •CBLAD •DCR •DEQ •VMRC | 1999-2001 | •N/A |

| OBJECTIVE 13 (Cont.) | | | | |
|--|---|--|-------------|--|
| <i>Enhance existing non-permit-based streambank and shoreline erosion control programs</i> | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 13.2 (Cont.) Enhance agency coordination regarding permits and data incorporation | Establish protocol to ensure all agencies collect data using the same methodology | <ul style="list-style-type: none"> •CBLAD •DCR •DEQ •DOF •DGIF •VDACS •VDOT | 1999-2001 | •N/A |
| | Conduct a review of how agencies utilize CBLAD comprehensive plan erosion element information | NPSAC | 1999-2002 | •N/A |
| 13.3 Conduct review of comprehensive plans and implementation of erosion strategies | | <ul style="list-style-type: none"> •CBLAD •DCR •DOF •NRCS •VMRC | 2003-2005 | <ul style="list-style-type: none"> •CBLAD •Unknown |

Management Measure : A plan to assess over time the success of the management measures in reducing pollution loads and improving water quality

| OBJECTIVE 14 | | | | |
|---|--|--------------------------------------|-------------|----------------------|
| Assess implementation of management measures | | | | |
| STRATEGIES | RELATED TASKS | AGENCIES & OTHERS | TARGET YEAR | FUNDING SOURCES |
| 14.1 Monitor and track implementation of 6217 program | Identify sources and types of information required to assess implementation of management measures | •DCR •DEQ | 1999-2001 | •N/A |
| | Identify reporting format and schedules | •DCR •DEQ | 1999-2001 | •N/A |
| | Prepare initial report to coincide with NOAA 312 evaluation - DCR, DEQ | •DCR •DEQ | 1999-2002 | •N/A |
| 14.2 Continue monitoring and preparing biennial Section 305 (b) reports | | •DCR •DEQ | 1999-2014 | •DEQ •DCR •EPA |
| 14.3 Continue annual reporting requirements of the Water Quality Improvement Act for BMP implementation | | •DCR | 1999-2014 | •WQIF |
| 14.4 Continue annual reporting requirements of the Agricultural BMP Cost-Share Program for BMP implementation | | •DCR | 1999-2014 | •DCR •EPA |
| 14.5 Continue to track land use and BMP location information | | •DCR •DEQ •DOF •EPA •VDH | 1999-2014 | •DCR •EPA |

NPS MANAGEMENT PROGRAM IMPLEMENTATION & REPORTING

Key to the ultimate success of any nonpoint source (NPS) pollution control program is the capability and commitment to monitor, track and assess implementation progress. Virginia uses a number of mechanisms to assess and report program effectiveness. Semi-annual, annual or biennial reports are required for most of Virginia's programs. These reports are the primary mechanism for conveying information to decision makers, state and federal agencies, and the public.

Section 319 of the Clean Water Act requires an annual program report and semi-annual project reporting. The annual report is intended to provide the mechanism by which Virginia describes progress toward implementing the broad program elements of the NPS Management Program. The semi-annual project report is a status report that describes progress toward achieving of project milestones.

The Chesapeake Bay Implementation Grant, Section 117 of the Clean Water Act, also has a semi-annual progress reporting requirement. This report is used to track project progress and implementation. A final report at the conclusion of the grant is also required.

The Water Quality Improvement Act requires that the directors of the Departments of Environmental Quality

(DEQ) and Conservation and Recreation (DCR) report, by January 1 of each year, to the governor and the General Assembly the amounts and recipients of grants made from the Virginia Water Quality Improvement Fund, and the specific and measurable pollution reduction achievements to state waters anticipated as a result of each grant award, together with the amounts of continued funding required for the coming fiscal year under all fully executed grant agreements. In addition, the Water Quality Improvement Act requires that DCR prepare an annual report to the governor and the General Assembly on whether cooperative NPS pollution programs, including nutrient reduction programs, developed pursuant to this section are being effectively implemented to meet the objectives of this article. Finally, DCR, in conjunction with other state agencies, shall evaluate and report on the impacts of NPS pollution on water quality and water quality improvement to the governor and the General Assembly. The evaluation shall, at a minimum, include considerations of water quality standards, fishing bans, shellfish contamination, aquatic life monitoring, sediment sampling, fish tissue sampling and human health standards. The report shall, at a minimum, include an assessment of the geographic regions where water quality is demonstrated to be impaired or degraded as the result of nonpoint source pollution and an evaluation of the basis or cause for

such impairment or degradation.

NPS pollution programs are also reported in the Semi-annual Section B Coastal Resources Management Program Report that is submitted to NOAA. Specific NPS program elements of this report include accomplishments related to stormwater, erosion and sediment control and the shoreline erosion advisory service programs.

Additionally there are well-developed tracking, monitoring and reporting activities specific to individual NPS program elements and agencies. For example, DOF has maintained a detailed logging inspection and best management practice (BMP) tracking data base since 1989. Other examples include the NPS Assessment Report, the Virginia Agricultural BMP Cost-Share Program, and the Virginia Water Quality Assessment 305 (b) Report. As a result of tributary strategy development, a protocol for tracking implementation of all BMPs has been designed and will be used to evaluate attainment of targeted priority pollutant reductions.

The long-term planning horizon for the NPS

Management Program is 15 years. However, implementation strategies set forth in this document are focused on the initial five years. Specific implementation schedules are presented in tabular format within each chapter of this document. It is intended that these tables be used as a guide for prioritizing and targeting agency resources and implementation activities. As indicated in federal guidance, a program update will be conducted every five years. It is anticipated that the Nonpoint Source Advisory Committee (NPSAC) will play an increasingly important role in program evaluation and guidance. Moreover, NPSAC will need to take an active role in helping to ensure that the program implementation schedule is met.

GLOSSARY

305(b) Water Quality Assessment a report prepared in compliance with both section 305 of the federal Clean Water Act and Virginia's Water Quality Monitoring, Information and Restoration Act

303(d) TMDL Priority List a listing of Virginia's impaired or threatened waters that is developed in compliance with section 303(d) of the federal Clean Water Act, Virginia's Water Quality Monitoring, Information and Restoration Act, and the State/EPA 106 agreement

adsorption process by which a solute is attracted to a solid surface—used in stormwater management BMPs to enhance the removal of soluble pollutants

ambient pertaining to the current environmental condition; ambient monitoring evaluates water quality periodically at fixed locations; data collected over long periods of time help determine the status and trends of water quality of a particular body of water

aquatic bench a 10-15 foot wide bench around the inside perimeter of a permanent pool that ranges in depth from 0-12 inches—vegetated with emergent plants, it augments pollutant removal, provides habitats, protects the shoreline from the effects of water level fluctuations, and enhances safety

aquifer water-bearing portion of a geologic formation that transmits water

assessment an evaluation of watersheds based on the presence or lack thereof of specific nonpoint source indicators

atmospheric deposition process by which atmospheric pollutants reach the land surface either as dry

deposition or as dissolved or particulate matter contained in precipitation

average land cover condition percentage of impervious cover considered to generate an equivalent amount of phosphorus as the total combined land uses within the Chesapeake Bay watershed at the time of the CBA adoption, assumed to be 16 percent.

basin management plan river basin plans developed under federal and/or state initiatives that include comprehensive, integrated activities to control NPS pollution to identified impaired stream segments, and to maintain water quality of unimpaired segments of Virginia's waterways—see *chapter V, Watershed Prioritization, for definitions of specific programs and activities*

beneficial use use of a [water] resource that includes, but is not limited to, domestic (including public water supply), agricultural, commercial, industrial, water-based recreational uses, and the propagation and growth of aquatic life

benthic pertains to the bottom, or bed, of a body of water

best management practice (BMP) structural or nonstructural practices or combination of practices that are determined to be the most effective and practical (including technological, economic, and institutional considerations) means of controlling point and nonpoint pollutant levels compatible with environmental quality goals

biological water quality sampling the use of biological or ecological characteristics, such as the growth, survival and reproduction of an aquatic species, the

diversity, structure and functioning of an aquatic community, and characterizations of aquatic habitat, to measure the "effects" of environmental impairment

bioretention basin water quality BMP engineered to filter the water quality volume through an engineered planting bed, consisting of a vegetated surface layer (vegetation, mulch, round cover), planting soil, and sand bed (optional), and into the in-situ material—also called rain gardens

bioretention filter bioretention basin with the addition of a sand layer and collector pipe system beneath the planting bed

catch basin an inlet chamber usually built at the curb line of a street or low area, for collection of surface runoff and admission into a sewer or subdrain—commonly has a sediment sump at its base, below the sewer or subdrain discharge elevation, designed to retain solids below the point of overflow

channel the main flow of a natural or manmade waterway

channel stabilization the introduction of natural or manmade materials placed within a channel so as to prevent or minimize the erosion of the channel bed and/or banks

channelization the straightening of a stream, primarily a result of human activity

chemical water quality monitoring the direct, quantitative measurement of physical parameters, of the quantity or concentration of specific chemical elements or compounds, or of chemical reaction rates in aquatic substrates; the medium evaluated may be water, sediment or biological tissues; the concept of chemical monitoring is based upon measures of the possible "causes" of environmental impairment

combined sewer overflow (CSO) sewer systems that combine sanitary waste and stormwater in instances of heavy rains, usually untreated; cities with older systems often have CSOs

conduit any channel intended for the conveyance of water, whether open or closed

confined animal feeding operation (CAFO) a lot or facility, together with any associated treatment works, where (1) animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period; and (2) crops, vegetation, forage growth or post-harvest residues are not sustained over any portion of the operation of the lot or facility (pertains to both operations that require a permit and non-permitted operations)

constructed stormwater wetlands areas intentionally designed and created to emulate the water quality improvement function of wetlands for the primary purpose of removing pollutants from stormwater

culvert man-made construction that diverts the natural flow of water

detention temporary impoundment or holding of stormwater runoff

detention basin a stormwater management facility that temporarily impounds runoff and discharges it through a hydraulic outlet structure to a downstream conveyance system

dissolved oxygen (DO) oxygen that has dissolved in water and is available for aquatic organisms (fish, invertebrates, plants and aerobic bacteria) for respiration

dredge to remove sediments from a stream bed to deepen or widen the channel

effluent wastewater discharge

environmental benefit an improvement in water quality and/or the structure and function of living resources

eutrophication the process of over-enrichment of water bodies by nutrients, often typified by the presence of algal blooms

existing construction (with failing sewage disposal systems) an existing structure where the sewage disposal system serving the structure has failed or is currently in violation of state law or regulations and requires correction

fecal typing assessment technique (e.g. DNA finger-

printing) used to isolate human and non-human sources of fecal coliform contamination in surface and ground water

first flush the first portion of runoff, usually defined as a depth in inches, considered to contain the highest pollutant concentration resulting from a rainfall event

floodplain for a given flood event, the area of land adjoining a continuous water course that has been covered temporarily by water

GIS Geographic Information System—a method of overlaying spatial land and land use data of different kinds. The data are referenced to a set of geographical coordinates and encoded in a computer software system. GIS is used by many localities to map utilities and sewer lines and to delineate zoning areas.

grade the slope of a specific surface of interest, such as a road, channel bed or bank, top of embankment, bottom of excavation, or natural ground—commonly measured in per cent (unit of measurement per one hundred units) or a ratio of horizontal to vertical distance

grassed swale an earthen conveyance system that is broad and shallow with check dams and vegetated with erosion resistant and flood tolerant grasses, engineered to remove pollutants from stormwater runoff by filtration through grass and infiltration into the soil

ground water any water, except capillary moisture, beneath the land surface in the zone of saturation or beneath the bed of any stream, lake, reservoir or other body of surface water within the boundaries of this commonwealth, whatever may be the subsurface geologic structure in which such water stands, flows, percolates or otherwise occurs

habitat assessment the evaluation of the physical, biological, and chemical environment and evaluation of its impact on biodiversity and ecosystem function and integrity

harvesting (forestry) all planning & design, road, log deck and skid trail construction, and maintenance during active logging to remove wood products from the forest to a processing plant

high priority watershed a watershed assigned to the

category of nominal scaling associated with the greatest impacts to water quality for the criteria being ranked (i.e., total agriculture high priority watershed). When a criteria is not explicitly referenced with this term, the highest rank of the overall (total) NPS pollution assignment is implied

impaired water water that is not meeting the state water quality standard; water with fish or shellfish harvesting prohibition by the Virginia Department of Health (VDH); and water where biological monitoring indicates moderate or severe impairment

impervious cover a surface composed of any material that significantly impedes or prevents natural infiltration of water into soil—includes (but not limited to) roofs, buildings, streets, parking areas, and any concrete, asphalt, or compacted gravel surface

impoundment an artificial collection or storage of water, as a reservoir, pit, dugout, sump, etc.

infiltration facility a stormwater management facility that temporarily impounds runoff and discharges it via infiltration through the surrounding soil—may be equipped with an outlet structure to discharge impounded runoff, such discharge is normally reserved for overflow and other emergency conditions. (infiltration basin, infiltration trench, infiltration dry well, and porous pavement are considered infiltration facilities)

intensity depth of rainfall divided by duration

karst topography regions that are characterized by formations underlain by carbonate rock typified by the presence of limestone caverns and sinkholes

land development a manmade change to, or construction on, the land surface that changes its runoff characteristics

land use any activities that takes place on land, such as construction, farming, or tree removal

land conversion final harvest of the forest with subsequent land-use conversion to agriculture, residential or commercial development, mining or highway construction

local political subdivision or locality a city, town,

county, district, association, or other public body created by or under state law

load or loading the introduction of an amount of matter or thermal energy into a receiving water; may be either man-caused (pollutant loading) or natural (background loading)

maintenance (forestry) maintenance includes upkeep of permanent road and trail systems, prescribed burning for fuel reduction or habitat selection, and use of herbicides

marsh a wet area, periodically inundated with standing or slow moving water, that has grassy or herbaceous vegetation and often little peat accumulation; the water may be salt, brackish or fresh

monitoring the physical, chemical and biological analysis of water quality parameters as well as predictive measures of assessing nonpoint source water quality impacts

municipal stormwater permit NPDES permit issued to municipalities to regulate discharges from municipal separate storm sewers for compliance with EPA regulations and specify stormwater control strategies

new construction construction of a building for which a building permit is required

nonpoint source (NPS) pollution diffused pollutants that are washed off the land (runoff) during the natural process of rainwater flowing across the land to rivers, lakes, oceans and other water bodies

nonpoint source assessment an evaluation of the state's waters on a watershed basis, consisting of the calculation of ordinal values for a number of NPS pollution related water quality impacting criteria, and resulting in (1) the nominal scaling of these criteria measures into three ranks, and (2) the creation of an overall NPS pollution water quality assignment similarly ranked

NPDES-National Pollutant Discharge Elimination System a national program in which pollution dischargers, such as factories and sewage treatment plants, are given permits to discharge. These permits contain limits on the pollutants they are allowed to

discharge

outfall place where effluent is discharged into receiving waters

pH term used to indicate the alkalinity or acidity of a substance, ranked on a scale from 1.0 (most acidic) to 14.0 (most basic), with 7.0 being neutral. Affects many chemical and biological processes in water— a range of pH 6.5-8.2 is optimal for most organisms

phosphorus an element found in fertilizers and sediment runoff which can contribute to the eutrophication of water bodies; it is the keystone pollutant in determining pollutant removal efficiencies for various BMPs as defined by the Virginia Stormwater Regulations

plasticulture agricultural production practice, usually used with fruits and vegetables, that covers a large portion of the field with plastic to heat up the soil and control weeds; land is graded so that stormwater is quickly drained to minimize excessive soil moisture levels

point source (PS) pollution discharges of treated or untreated effluent from industries, wastewater treatment plants and other sources that can be traced back to a single point of discharge. Some sources (leaching landfills, hazardous wastes, brownfields, materials storage, airport deicing, underground storage tanks, etc.) are subject to question, as to whether they fall into the point or nonpoint source category. In these situations, where NPDES permitting applies, the State of Virginia considers the issue a point source pollution problem, and the topic is not addressed in this nonpoint source pollution management plan.

post-harvest site restoration all road, deck and skid trail restoration activities, mechanical site preparation, prescribed burning to remove logging debris, and tree planting to facilitate reforestation of the logged site

pretreatment techniques employed in a stormwater management plan to provide storage or filtering to help trap coarse materials before they enter the stormwater BMP—required on some BMPs to avoid costly maintenance

retention permanent storage of stormwater

retention basin a stormwater management facility which includes a permanent impoundment, or normal pool of water, for the purpose of enhancing water quality and, therefore, is normally wet, even during non-rainfall periods—storm runoff inflows may be temporarily stored above this permanent impoundment for the purpose of reducing flooding, or stream channel erosion

riparian of or pertaining to the banks of a body of water

riparian restoration tree planting to restore forest buffers and associated habitat in areas immediately adjacent to streams, rivers and wetlands, to reduce pollution entering streams from these adjacent land uses

rip-rap broken rock, cobbles or boulders placed on earth surfaces, such as the face of a dam or the bank of a stream for the protection against erosive forces, such as flow velocity and waves

runoff the portion of precipitation, snow melt or irrigation water that runs off the land into surface waters
runoff pollution-see nonpoint source pollution

sediment material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by water or wind; sediment piles up in reservoirs, rivers and harbors, destroying wildlife habitat and clouding water so that sunlight can not reach aquatic plants

sedimentation (settling) a pollutant removal method to treat stormwater runoff in which gravity is utilized to remove particulate pollutants; pollutants are removed from the stormwater as sediment settles or falls out of the water column (example of BMP utilizing sedimentation is a detention basin)

septage material accumulated in a pretreatment system or privy—the mat of grease and scum on the surface of septic tanks, the accumulated sludge at the bottom of tanks and the sewage present at the time of pumping

sewage water-carried and nonwater-carried human excrement, kitchen, laundry, shower, bath or lavatory wastes separately or together with such underground, surface, storm and other water and liquid industrial wastes as may be present from residences, buildings, vehicles, industrial establishments or other places.

sewage disposal system a sewerage system or treatment works designed not to result in a point source discharge

sewer any sanitary or combined sewer used to convey sewage or municipal or industrial wastes

sewerage system pipe lines or conduits, pumping stations and force mains and all other construction, devices and appliances appurtenant thereto, used for the collection and conveyance of sewage to a treatment works or point of ultimate disposal

silviculture forestry (development and care of forests) and the commercial farming of trees

site the parcel of land being developed, or a designated planning area in which a land development project is located

soil test chemical analysis of soil to determine the need for fertilizers or amendments for species of plant being grown

state project any land development project which is undertaken by any state agency, board, commission, authority or any branch of state government, including state supported institutions of higher learning

storm sewer a system of pipes, separate from sanitary sewers, that only carries runoff from buildings and land surfaces

stormwater basin a facility designed to impound stormwater runoff

stormwater management facility a device that controls stormwater runoff and changes the characteristics of that runoff including, but not limited to, the quantity and quality, the period of release or the velocity of flow

stormwater management plan a document describing how existing runoff characteristics will be affected by a land development project and methods for complying with the requirements of the local program

stream buffers (riparian buffers) the zones of variable width which are located along both side of a stream and are designed to provide a protective natural area along a stream corridor

subsurface soil absorption a process that utilizes the soil to treat and dispose of effluent from a treatment works

state waters all waters on the surface or under the ground, wholly or partially within or bordering the Commonwealth of Virginia or within its jurisdictions

total maximum daily load (TMDL) the maximum amount of a pollutant that a water body can receive daily without violating water quality standards; includes best estimates of pollution from nonpoint sources, natural background sources, point sources, and a margin of safety; can also be defined as the strategy which is implemented to reduce or eliminate the impact of pollution

total suspended solids (TSS) total amount of particulate matter which is suspended in the water column

treatment works any device or system used in the storage, treatment, disposal or reclamation of sewage and industrial wastes, including but not limited to pumping, power and other equipment and appurtenances, septic tanks and any works, including land, that are or will be an integral part of the treatment process or used for ultimate disposal of residues or effluent resulting from such treatment

tributary a body of water that drains into another, usually larger, body of water

tributary strategies a state watershed initiative, Virginia's Tributary Strategy Program, which requires the development of strategies and written plans to restore water quality and living resources of the Chesapeake Bay and its tributaries

turbidity cloudiness of a liquid, caused by suspended solids; a measure of the suspended solids in a liquid

ultra-urban densely developed urban areas in which little pervious surface exists

urban runoff stormwater from city streets and adjacent domestic or commercial properties that carries nonpoint source pollutants of various kinds into the sewer systems and receiving waters

Water Quality Improvement Act of 1997 a state watershed initiative which "establishes cooperative programs related to nutrient reduction and other point and nonpoint sources of pollution" to restore and improve the quality of state waters and to protect them from impairment and destruction for the benefit of current and future citizens

Water Quality Improvement Fund state funds allocated for the Agriculture Cost-Share Program and nonpoint source pollution prevention, reduction and control projects through an annual grants awards process

water quality standards state-adopted and EPA-approved ambient standards for water bodies; the standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses

watershed a drainage area or basin in which all land and water areas drain or flow toward a central collector such as a stream, river, or lake at a lower elevation

water table the uppermost surface of ground water saturation—the level in the saturated zone at which the pressure is equal to atmospheric pressure

water well or well any artificial opening or artificially altered natural opening, however made, by which ground water is sought or through which ground water flows under natural pressure or is intended to be artificially drawn; provided this definition shall not include wells drilled for exploration or production of gas or oil; building foundation investigation and construction; elevator shafts; grounding of electrical apparatus; or the modification or development of springs

weir a wall or plate placed in an open channel to regulate or measure the flow of water

ABBREVIATIONS

| | |
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| ACOE | U.S. Army Corps of Engineers |
| AMD | Acid Mine Drainage |
| AML | Abandoned Mine Land |
| AOSE | Authorized On-site Soil Evaluators |
| BMP | Best Management Practice |
| CAFO | Confined Animal Feeding Operations |
| CBF | Chesapeake Bay Foundation |
| CBLAD | Chesapeake Bay Local Assistance Department |
| CBPA | Chesapeake Bay Preservation Act |
| CEQ | Council on Environmental Quality |
| CNPSPC | Coastal Nonpoint Source Pollution Control |
| CWA | Clean Water Act |
| CWC | Coastal Watershed Center |
| CWI | Clean Watershed Initiative |
| CZARA | Coastal Zone Management Act Reauthorization Amendments |
| DCR | Department of Conservation and Recreation, Virginia |
| DEQ | Department of Environmental Quality, Virginia |
| DGIF | Department of Game and Inland Fisheries, Virginia |
| DGO | Division of Gas and Oil |
| DMLR | Division of Mined Land Reclamation |
| DMM | Division of Mineral Mining |
| DMME | Department of Mines, Minerals and Energy, Virginia |
| DOF | Department of Forestry, Virginia |
| DOI | U.S. Department of the Interior |
| EA | Environmental Assessment |
| EIR | Environmental Impact Review |
| E&S | Erosion and Sediment (Control) |
| EPA | U.S. Environmental Protection Agency |
| ESC | Erosion and Sediment Control |
| FONSI | Funding of No Significant Impact |
| GIS | Geographic Information System |
| HEL | Highly erodible land |
| HRPDC | Hampton Roads Planning District Commission |
| IMCC | Interstate Mining Compact Commission |
| ITE | Institute of Transportation Engineers |
| LOA | Letter of Agreement |
| MOA | Memorandum of Agreement |
| MOU | Memorandum of Understanding |
| MTAS | Marine Technical Advisory Service |
| NEPA | National Environmental Policy Act |
| NOAA | National Oceanic and Atmospheric Administration |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | Nonpoint Source Pollution |

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| NPSAC | Nonpoint Source Advisory Committee |
| NRCS | Natural Resources Conservation Service |
| orgs | organizations |
| OSDS | Onsite Sewage Disposal System |
| OSM | U.S. Department of the Interior Office of Surface Mining |
| PDC | Planning District Commission |
| RAMP | Rural Abandoned Mine Program |
| RRPDC | Richmond Regional Planning District Commission |
| SAV | Submerged aquatic vegetation |
| SDWA | Safe Drinking Water Act |
| SEAS | Shoreline Erosion Advisory Service |
| SMCRA | Surface Mining Control and Reclamation Act |
| SMRA | Stormwater Management Regulations and Act |
| SONR | Secretary of Natural Resources |
| SWCD | Soil and Water Conservation District |
| TMDL | Total Maximum Daily Load |
| TSS | Total Suspended Solids |
| USFS | United States Forest Service |
| USGS | United States Geologic Survey |
| Virginia Tech | Virginia Polytechnic Institute and State University |
| VirGIS | Virginia Geographic Information System |
| VCE | Virginia Cooperative Extension |
| VCP | Virginia Coastal Program |
| VDACS | Virginia Department of Agriculture and Consumer Services |
| VDH | Virginia Department of Health |
| VDOT | Virginia Department of Transportation |
| VIMS | Virginia Institute of Marine Science |
| VMRC | Virginia Marine Resources Commission |
| VPDES | Virginia Pollutant Discharge Elimination System |
| VPI&SU | Virginia Polytechnic Institute and State University |
| VR | Virginia Register |
| WQIA | Water Quality Improvement Act |
| WQIF | Water Quality Improvement Fund |
| WRAS | Watershed Restoration Action Strategy |